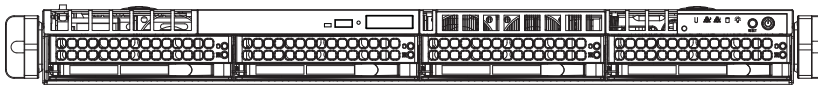
SUPERMICRO®

SUPERSERVER 6016T-6RFT+
SUPERSERVER 6016T-6RF+



USER'S MANUAL

1.0

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Manual Revision 1.0
Release Date: August 4, 2010

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 6016T-6RFT+/6016T-6RF+. Installation and maintenance should be performed by experienced technicians only.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the X8DTU-6TF+/X8DTU-6F+ serverboard and the SC819TQ-R700U chassis, which comprise the SuperServer 6016T-6RFT+/6016T-6RF+.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 6016T-6RFT+/6016T-6RF+.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X8DTU-6TF+/X8DTU-6F+ serverboard, including the locations and functions of connections, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC819TQ-R700U server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SATA or peripheral drives and when replacing system power supply modules and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS Error Beep Codes

Appendix B: System Specifications

Notes

Table of Contents

Chapter 1 Introduction

1-1 Overview 1-1
1-2 Serverboard Features 1-2
Processors 1-2
Memory 1-2
UIO 1-2
Onboard SAS 1-2
Onboard Serial ATA 1-2
Rear I/O Ports 1-3
Graphics Controller 1-3
Other Features 1-3
1-3 Server Chassis Features 1-3
System Power 1-3
Hard Drives 1-3
PCI Expansion Slots 1-4
Front Control Panel 1-4
Cooling System 1-4
1-4 Contacting Supermicro 1-6

Chapter 2 Server Installation

2-1 Overview 2-1
2-2 Unpacking the System 2-1
2-3 Preparing for Setup 2-1
Choosing a Setup Location 2-1
Rack Precautions 2-2
Server Precautions 2-2
Rack Mounting Considerations 2-3
Ambient Operating Temperature 2-3
Reduced Airflow 2-3
Mechanical Loading 2-3
Circuit Overloading 2-3
Reliable Ground 2-3
2-4 Installing the System into a Rack 2-4
Identifying the Sections of the Rack Rails 2-4
Installing the Inner Rails 2-4
Installing the Outer Rails 2-5
Installing the Server into a Telco Rack 2-6

2-5 Checking the Serverboard Setup 2-8

Chapter 3 System Interface

3-1 Overview 3-1
3-2 Control Panel Buttons 3-1
UID 3-1
Reset 3-1
Power 3-1
3-3 Control Panel LEDs 3-2
UID/Overheat/Fan Fail/Power Fail 3-2
NIC2 3-2
NIC1 3-2
HDD 3-2
Power 3-3
3-4 Drive Carrier LEDs 3-3

Chapter 4 System Safety

4-1 Electrical Safety Precautions 4-1
4-2 General Safety Precautions 4-2
4-3 ESD Precautions 4-3
4-4 Operating Precautions 4-4

Chapter 5 Advanced Serverboard Setup

5-1 Handling the Serverboard 5-1
Precautions 5-1
Unpacking 5-1
5-2 Processor and Heatsink Installation 5-2
Installing LGA1366 Processors 5-2
Installing the Heatsink 5-4
Removing the Heatsink 5-5
5-3 Connecting Cables 5-6
Connecting Data Cables 5-6
Connecting Power Cables 5-6
Connecting the Control Panel 5-6
5-4 I/O Ports 5-7
5-5 Installing Memory 5-8
5-6 Adding PCI Cards 5-12
5-7 Serverboard Details 5-13
X8DTU-6TF+/X8DTU-6F+ Quick Reference 5-14
5-8 Connector Definitions 5-15
5-9 Jumper Settings 5-23

5-10 Onboard Indicators 5-25
5-11 SATA Port Connections 5-27
5-12 Installing Software 5-28
Supero Doctor III 5-29

Chapter 6 Advanced Chassis Setup

6-1 Static-Sensitive Devices 6-1
Precautions 6-1
6-2 Control Panel 6-2
6-3 System Fans 6-3
System Fan Failure 6-3
Hard Drive Installation 6-5
Hard Drive Backplane 6-6
DVD-ROM Drive Installation 6-7
6-4 Power Supply 6-8
Power Supply Failure 6-8

Chapter 7 BIOS

7-1 Introduction 7-1
Starting BIOS Setup Utility 7-1
How To Change the Configuration Data 7-1
Starting the Setup Utility 7-2
7-2 Main Setup 7-2
7-3 Advanced Setup Configurations 7-4
7-4 Security Settings 7-25
7-5 Boot Configuration 7-27
7-6 Exit Options 7-28

Appendix A BIOS Error Beep Codes

Appendix B System Specifications

Chapter 1

Introduction

1-1 Overview

The SuperServer 6016T-6RFT+/6016T-6RF+ is a high-end server comprised of two main subsystems: the SC819TQ-R700U 1U server chassis and the X8DTU-6TF+/X8DTU-6F+ dual processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.supermicro.com).

In addition to the serverboard and chassis, various hardware components have been included with the 6016T-6RFT+/6016T-6RF+, as listed below:

- One slim DVD-ROM drive (DVM-TEAC-DVD-SBT)
- Five sets of 4-cm counter-rotating fans (FAN-0086L4)
- One air shroud (MCP-310-81901-0B)
- Two passive CPU heatsinks (SNK-P0037P)
- Riser Cards: (see Section 5-6 for details)
  One RSC-R1UU-2E8
  One RSC-R1UU-E8R+
- SATA Accessories
  One SATA backplane (BPN-SAS-815TQ)
  One SAS cable (CBL-0288L)
  Four SATA drive carriers (MCP-220-00075-0B)
- One rackmount kit (MCP-290-00062-0N)
- One CD containing drivers and utilities
- SuperServer 6016T-6RFT+/6016T-6RF+ User's Manual

1-2 Serverboard Features

At the heart of the SuperServer 6016T-6RFT+/6016T-6RF+ lies the X8DTU-6TF+/X8DTU-6F+, a dual processor serverboard based on the Intel® 5520 chipset. Below are the main features of the serverboard. (See Figure 1-1 for a block diagram of the chipset).

Processors

The X8DTU-6TF+/X8DTU-6F+ supports single or dual Intel® 5500/5600 Series processors in LGA1366 sockets. Please refer to our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X8DTU-6TF+/X8DTU-6F+ features 18 DIMM sockets that can support up to 192 GB of registered ECC DDR3-1333/1066/800 or 48 GB of unbuffered ECC/non-ECC DDR3-1333/1066/800 SDRAM. Please refer to Chapter 5 for installing memory.

UIO

The X8DTU-6TF+/X8DTU-6F+ is a specially-designed serverboard that features Supermicro's UIO (Universal I/O) technology. UIO serverboards have a PCI Express 2.0 x8 slot that can support any one of several types of UIO card types to add SAS ports, SATA ports, additional LAN ports or other additional functions to the serverboard. This allows the user to tailor the serverboard to their own needs.

Note: the server does not come with a UIO card installed.

Onboard SAS

An onboard LSI 2108 SAS controller in integrated into the X8DTU-6TF+/X8DTU-6F+. The hot-swap SAS drives are connected to a backplane that provides power, bus termination and configuration settings.

Note: The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the SAS drives. RAID 0, 1, 5, 6, 10, 50 and 60 is supported. Refer to the following ftp site for setup guidelines <ftp://ftp.supermicro.com/driver/SAS/LSI/LSI_SAS_EmbMRAID_SWUG.pdf>.

Onboard Serial ATA

An on-chip (ICH10R) SATA controller is integrated into the X8DTU-6TF+/X8DTU-6F+ to provide a six-port, 3 Gb/sec SATA subsystem, which is RAID 0, 1, 5 and

10 supported (RAID 5 is supported with Windows OS only). The SATA drives are hot-swappable units.

Note: You must have RAID set up to enable the hot-swap capability of the SATA drives. Documentation on RAID setup guidelines can be found on our web site.

Rear I/O Ports

The color-coded I/O ports include one COM port, a VGA (monitor) port, two USB 2.0 ports, PS/2 mouse and keyboard ports, one dedicated IPMI LAN port and two gigabit Ethernet ports. The 6016T-6RFT+ (X8DTU-6TF+) includes two additional Ethernet ports.

Graphics Controller

The X8DTU-6TF+/X8DTU-6F+ features an integrated Matrox G200eW graphics chip.

Other Features

Other onboard features that promote system health include onboard voltage monitors, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

1-3 Server Chassis Features

The 6016T-6RFT+/6016T-6RF+ is built upon the SC819TQ-R700U chassis. Details on the chassis and on servicing procedures can be found in Chapter 6.The following is a general outline of the main features of the chassis.

System Power

The SC819TQ-R700U features a redundant 700W power supply consisting of two power modules. The system does not need to be shut down when replacing or removing a single power supply module.

Hard Drives

The SC819TQ-R700U chassis was designed to support four hot-swap SAS or SATA hard drives.

PCI Expansion Slots

Two riser cards are included. The RSC-R1UU-E8R+ is located on the right side of the chassis and supports one low-profile PCI-E x4 card (in a x8 slot). The RSC-R1UU-2E8 is located on the left side of the chassis and supports two PCI-E x8 add-on cards. See our web site for details (http://www.supermicro.com/products/nfo/UIO.cfm). See section 5-6 of this manual for details.

Front Control Panel

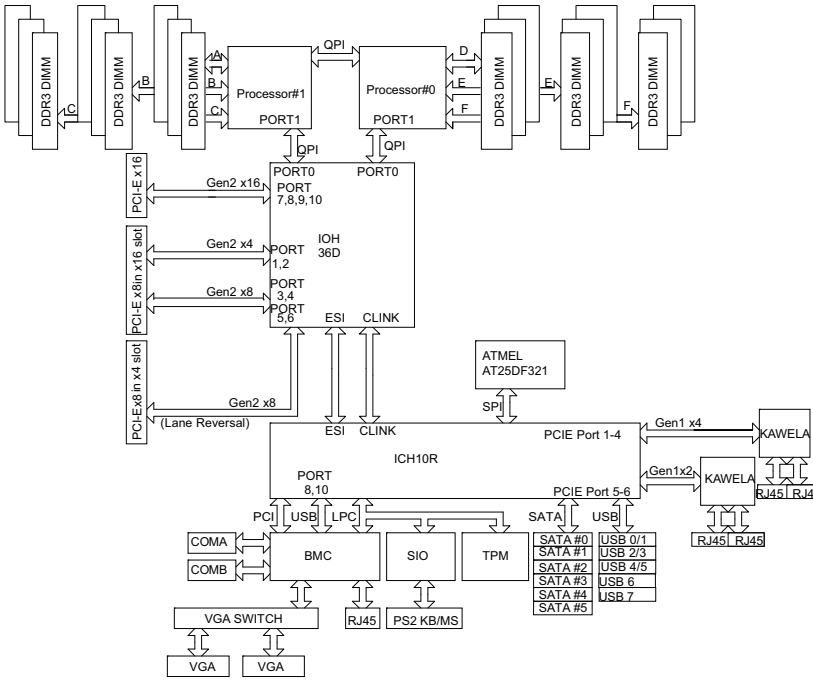
The chassis' control panel provides you with system monitoring and control. LEDs indicate system power, HDD activity, network activity (2), overheat/fan/power failure and UID (Unit Identifier). A main power button and a UID button is also included.

Cooling System

The SC819TQ-R700U has an innovative cooling design that features five sets of 4-cm counter-rotating fans located in the middle section of the chassis. There is a "Fan Speed Control Mode" setting in BIOS that allows chassis fan speed to be determined by system temperature. The power supply module also includes a cooling fan.

Figure 1-1. Intel 5520 + IOH-36D/ICH10R Chipset: System Block Diagram

Note: This is a general block diagram. Please see Chapter 5 for details.



1-4 Contacting Supermicro

Headquarters

Address:	Super Micro Computer, Inc.
	980 Rock Ave.
	San Jose, CA 95131 U.S.A.
Tel:	+1 (408) 503-8000
Fax:	+1 (408) 503-8008
Email:	marketing@supermicro.com (General Information)
	support@supermicro.com (Technical Support)
Web Site:	www.supermicro.com

Europe

Address:	Super Micro Computer B.V.
	Het Sterrenbeeld 28, 5215 ML
	's-Hertogenbosch, The Netherlands
Tel:	+31 (0) 73-6400390
Fax:	+31 (0) 73-6416525
Email:	sales@supermicro.nl (General Information)
	support@supermicro.nl (Technical Support)
	rma@supermicro.nl (Customer Support)

Asia-Pacific

Address:	Super Micro Computer, Inc.
	4F, No. 232-1, Liancheng Rd.
	Chung-Ho 235, Taipei County
	Taiwan, R.O.C.
Tel:	+886-(2) 8226-3990
Fax:	+886-(2) 8226-3991
Web Site:	www.supermicro.com.tw
Technical Support:	
Email:	support@supermicro.com.tw
Tel:	886-2-8228-1366, ext.132 or 139

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your 6016T-6RFT+/6016T-6RF+ up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory pre-installed. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the 6016T-6RFT+/6016T-6RF+ was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the 6016T-6RFT+/6016T-6RF+. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Be sure to read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the 6016T-6RFT+/6016T-6RF+ was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.This product is for

installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

Warnings and Precautions!

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SAS/SATA drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

2-4 Installing the System into a Rack

This section provides information on installing the 6016T-6RFT+/6016T-6RF+ into a rack unit with the rack rails provided. If the system has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

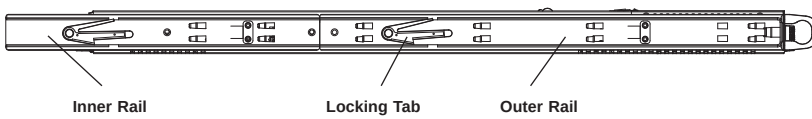
Identifying the Sections of the Rack Rails

You should have received two rack rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself (see Figure 2-1). Two pairs of short brackets to be used on the front side of the outer rails are also included.

Installing the Inner Rails

Both the left and right side inner rails have been pre-attached to the chassis. Proceed to the next step.

Figure 2-1. Identifying the Sections of the Rack Rails (left side rail shown)



Installing the Outer Rails

Installing the Outer Rails to the Rack

1. Measure the distance from the front rail to the rear rail of the rack.

2. Attach a short bracket to the front side of the right outer rail and a long bracket to the rear side of the right outer rail.

3. Adjust both the short and long brackets to the proper distance so that the rail can fit snugly into the rack.

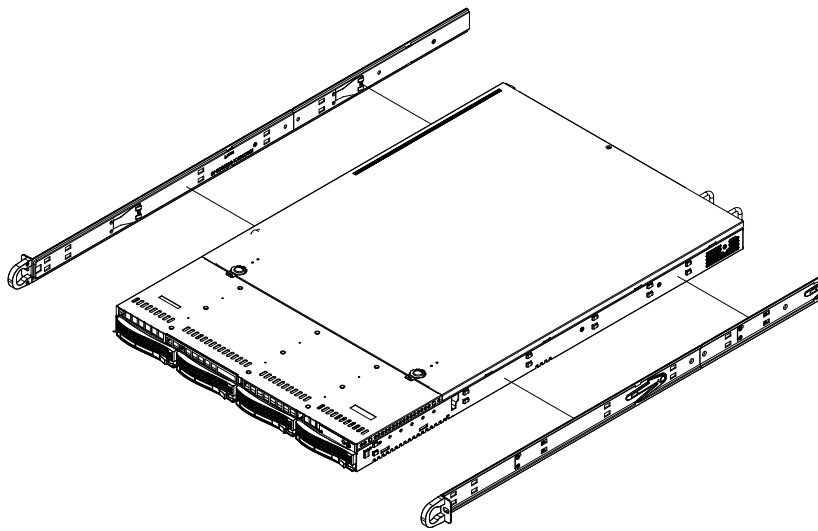
4. Secure the short bracket to the front side of the outer rail with two M4 screws and the long bracket to the rear side of the outer rail with three M4 screws.

5. Repeat these steps for the left outer rail.

Locking Tabs

Both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

Figure 2-2. Installing the Rack Rails



Installing the Server into the Rack

Installing the Chassis into a Rack (Figure 2-3)

1. Confirm that chassis includes the inner rails and rail extensions . Also, confirm that the outer rails are installed on the rack.

2. Line chassis rails with the front of the rack rails.

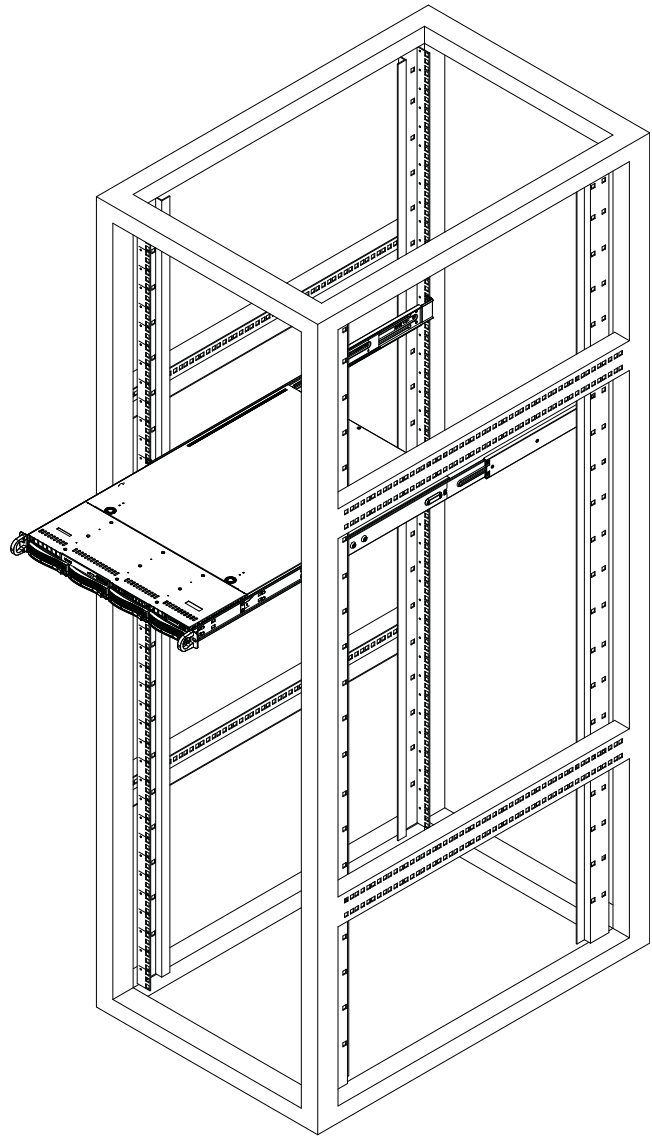
3. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). When the server has been pushed completely into the rack, you should hear the locking tabs "click".

4. (Optional) Insert and tightening the thumbscrews that hold the front of the server to the rack.

Installing the Server into a Telco Rack

To install the 6016T-6RFT+/6016T-6RF+ into a Telco type rack, use two L-shaped brackets on either side of the chassis (four total). First, determine how far follow the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the telco rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

Figure 2-3. Installing the Server into a Rack



2-5 Checking the Serverboard Setup

After you install the system in the rack, you will need to open the top cover to make sure the serverboard is properly installed and all the connections have been made.

Accessing the Inside of the System

1. First, grasp the two handles on either side and pull the system straight out until it locks (you will hear a "click").

2. Next, press the two buttons on the top of the chassis to release the top cover.

3. Push the cover away from you (toward the rear of the chassis) until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

4. To remove the system from the rack completely, press the locking tabs in the chassis rails (push the right-side tab down and the left-side tab up) to continue to pull the system out past the locked position.

Checking the Components

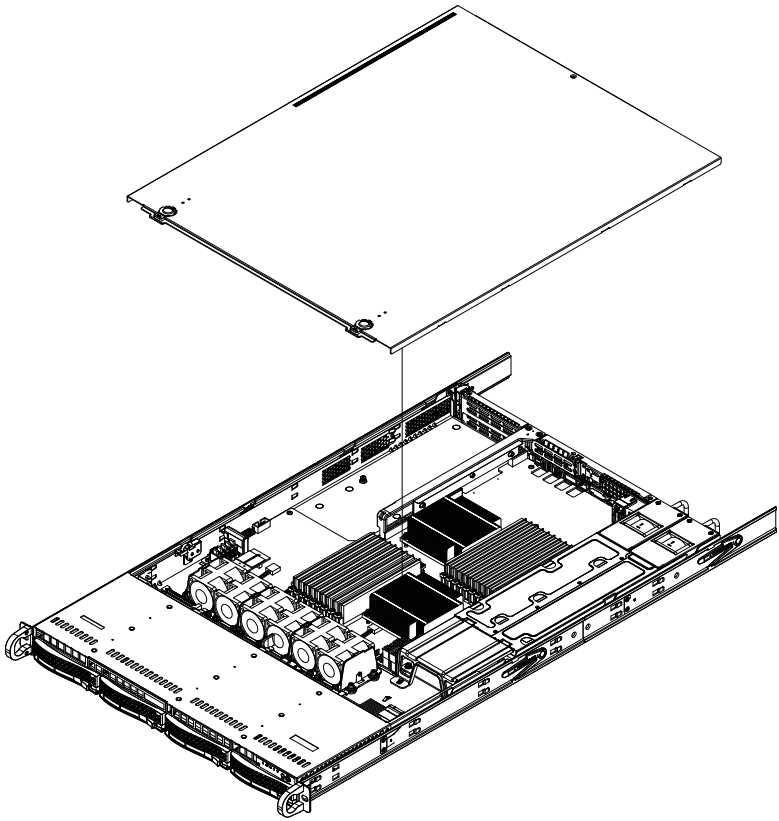
1. You may have one or two processors already installed in the serverboard. Each processor needs its own heatsink. See Chapter 5 for instructions on processor and heatsink installation.

2. Your server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

3. If desired, you can install an add-on card to the system. See Chapter 5 for details on installing PCI add-on cards.

4. Make sure all power and data cables are properly connected and not blocking the chassis airflow. See Chapter 5 for details on cable connections.

Figure 2-4. Accessing the Inside of the System



2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the hard drives and backplane have been properly installed and all connections have been made.

Checking the Drives

1. All drives are accessable from the front of the server. The hard disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.

2. A slim DVD-ROM drive should be preinstalled in your server. For servicing the DVD-ROM drive, you will need to remove the top chassis cover. Refer to Chapter 6 if you need to reinstall a DVD-ROM drive to the system.

3. Depending upon your system's configuration, your system may have one or more drives already installed. If you need to install hard drives, please refer to Chapter 6.

Checking the Airflow

1. Airflow is provided by five sets of 4-cm fans (each set of fans consists of two fans that are mounted back to back). The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat.

2. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

***Providing* Power**

1. The last thing you must do is to provide input power to the system. Plug the power cord from the power supply module into a high-quality power strip that offers protection from electrical noise and power surges.

2. It is recommended that you use an uninterruptible power supply (UPS) source.

Chapter 3

System Interface

3-1 Overview

There are several LEDs on the control panel as well as others on the hard drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel and an on/off switch on the power supply. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

3-2 Control Panel Buttons

There are three push-buttons located on the front of the chassis. These are (in order from left to right) A UID button, a reset button and a power on/off button.

UID

Depressing the UID (unit identifier) button illuminates an LED on both the front and rear of the chassis for easy system location in large stack configurations. The LED will remain on until the button is pushed a second time. Another UID button on the rear of the chassis serves the same function.

Reset

The reset button reboots the system.

Power

The main power switch is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC819TQ chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

UID/Overheat/Fan Fail/Power Fail

Blue: This LED turns on when either the front or the rear UID button is pushed. Pushing either button a second time will turn this LED off.

Red: When this LED flashes quickly it indicates a fan failure. When flashing slowly it indicates a power supply failure. When on continuously (on and not flashing) it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the overheat condition exists.

NIC2

Indicates network activity on GLAN2 when flashing .

NIC1

Indicates network activity on GLAN1 when flashing.

HDD

Indicates IDE channel activity. On the 6016T-6RFT+/6016T-6RF+ this light indicates HDD and/or DVD-ROM drive activity when flashing.

Power

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 Drive Carrier LEDs

- **Green:** Each SAS/SATA drive carrier has a green LED. When illuminated, this green LED indicates drive activity. A connection to the SAS/SATA backplane enables this LED to blink on and off when that particular drive is being accessed. Please refer to Chapter 6 for instructions on replacing failed SAS/SATA drives.

- **Red:** The red LED to indicate a SAS/SATA drive failure. If one of the drives fail, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed SAS/SATA drives.

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 6016T-6RFT+/6016T-6RF+ from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

- Do not work alone when working with high voltage components.

- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and floppy drive. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.

- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets. The unit has more than one power

supply cord. Disconnect both power supply cords before servicing to avoid electrical shock

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032). Dispose of used batteries according to the manufacturer's instructions.

- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced (CR2032). Contact technical support for details and support.

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the system clean and free of clutter.

- The 6016T-6RFT+/6016T-6RF+ weighs approximately 38.5 lbs. (17.5 kg.) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit after ensuring that all connections have been made.

4-3 ESD Precautions

Electrostatic Discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.

- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

- Touch a grounded metal object before removing the board from the antistatic bag.

- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.

- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.

- When handling chips or modules, avoid touching their pins.

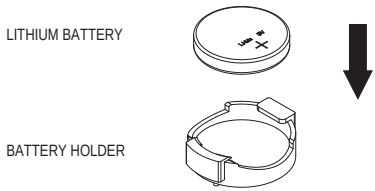
- Put the serverboard and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 6016T-6RFT+/6016T-6RF+ is operating to assure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the X8DTU-6TF+/X8DTU-6F+ serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling.

The following measures are generally sufficient to protect your equipment from static discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

5-2 Processor and Heatsink Installation

When handling the processor, avoid placing direct pressure on the label area of the fan. Also, do not place the serverboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

IMPORTANT! Always connect the power cord last and remove it first before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket *before* you install the heatsink and fan. The X8DTU-6TF+/X8DTU-6F+ can support either one or two processors. If installing one processor only, install it into the CPU1 socket.

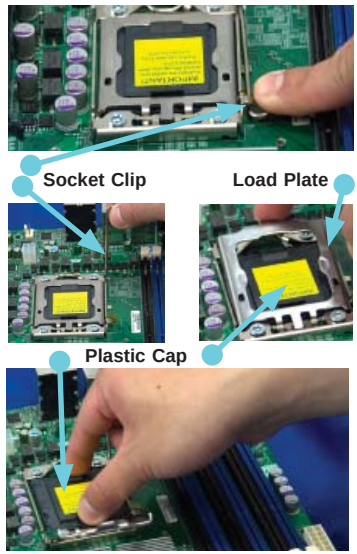
Note:

When purchasing a CPU or when receiving a serverboard with a CPU pre-installed, make sure that the CPU plastic cap is in place and none of the CPU pins are bent; otherwise, contact the retailer immediately.

Installing LGA1366 Processors

1. Starting with CPU1, press the socket clip to release the load plate, which covers the CPU socket, from its locked position.
2. Gently lift the socket clip to open the load plate.
3. Hold the plastic cap at its north and south center edges to remove it from the CPU socket.

Note: The photos on this page and succeeding pages are for illustration purposes only. They do not necessarily reflect the exact product(s) described in this manual.



Holding the north & south edges

1. After removing the plastic cap, use your thumb and the index finger to hold the CPU at the north and south center edges.

2. Align the CPU key (the semi-circle cutout) with the socket key (the notch below the gold color dot on the side of the socket).

3. Once the CPU and the socket are aligned, carefully lower the CPU straight down into the socket. Do not rub the CPU against the surface of the socket or its pins to avoid damaging the CPU or the socket.

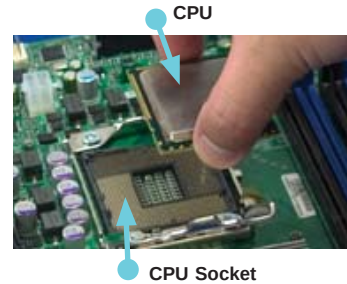
4. With the CPU in the socket, inspect the four corners of the CPU to make sure that it sits level and is properly installed.

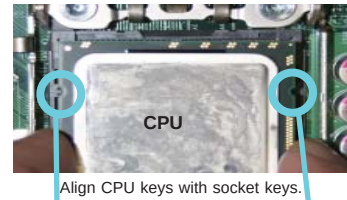
5. Once the CPU is securely seated in the socket, lower the CPU load plate to the socket.

6. Use your thumb to gently push the socket clip down to the clip lock.

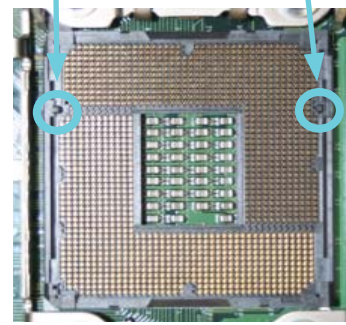
7. Repeat for the CPU2 socket for a dual-processor configuration.

Important! Please save the plastic cap. The serverboard must be shipped with the plastic cap properly installed to protect the CPU socket pins. Shipment without the plastic cap properly installed may cause damage to the socket pins.

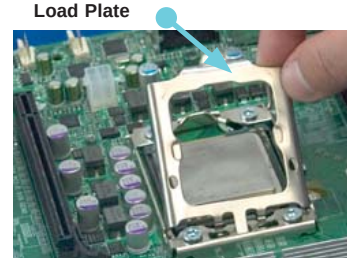




Align CPU keys with socket keys.



Load Plate



Installing the Heatsink

1. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the retention mechanism.

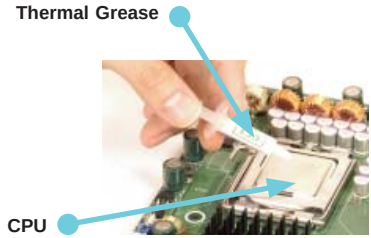
2. Remove the thin layer of protective film from the copper core of the heatsink.

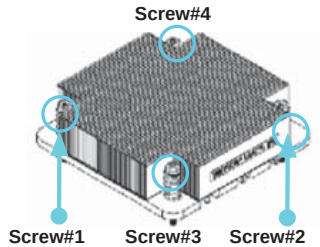
Warning: The CPU may overheat if the protective film is not removed from the heatsink.

3. Apply the proper amount of thermal grease on the CPU. If your heatsink came with a thermal pad, please ignore this step.

4. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug (do not over-tighten the screws, which may damage the CPU.)

5. Finish the installation by fully tightening all four screws.





Removing the Heatsink

Warning: We do not recommend removing the CPU or the heatsink. If you do need to remove the heatsink, please follow the instructions below to prevent damage to the CPU or other components.

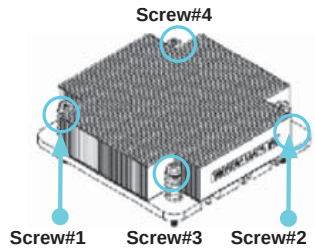
1. Unplug the power cord from the power supply.

1. Unscrew and remove the heatsink screws in the sequence shown in the picture below.

2. Hold the heatsink and gently wiggle it to loosen it from the CPU. (Do not use excessive force when doing this!)

3. Once the heatsink is loosened, remove it from the CPU.

4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease before you re-install the heatsink.



5-3 Connecting Cables

Now that the processors are installed, the next step is to connect the cables to the serverboard.

Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables.

The following data cables (with their connector locations noted) should be connected. See the serverboard layout diagram in this chapter for connector locations.

- DVD-ROM drive cable (SATA0)
- SAS cables (SAS0 ~ SAS3)
- Control Panel cable (JF1, see next page)

Connecting Power Cables

The X8DTU-6TF+/X8DTU-6F+ has a 24-pin primary power supply connector designated "JPW1" for connection to the ATX power supply. Connect the appropriate connector from the power supply to JPW1 to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions. In addition, your power supply must be connected to the 8-pin Processor Power connectors at JPW2 and JPW3.

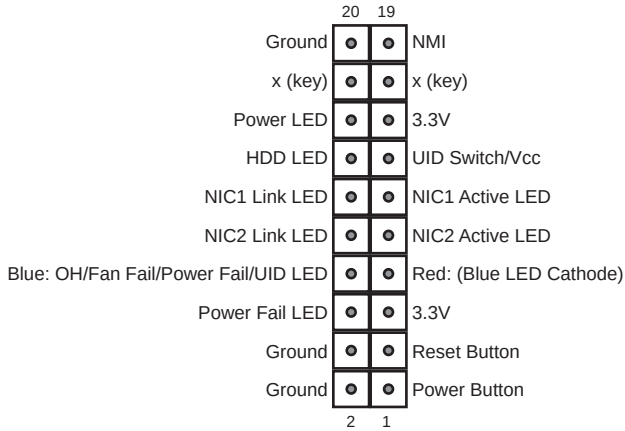
Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the front control panel buttons and LED indicators. Please note that even and odd numbered pins are on opposite sides of each header.

All JF1 wires have been bundled into single keyed ribbon cable to simplify their connection. The red wire in the ribbon cable plugs into pin 1 of JF1. Connect the other end of the cable to the Control Panel printed circuit board, located just behind the system status LEDs in the chassis.

See the Connector Definitions section in this chapter for details and pin descriptions of JF1.

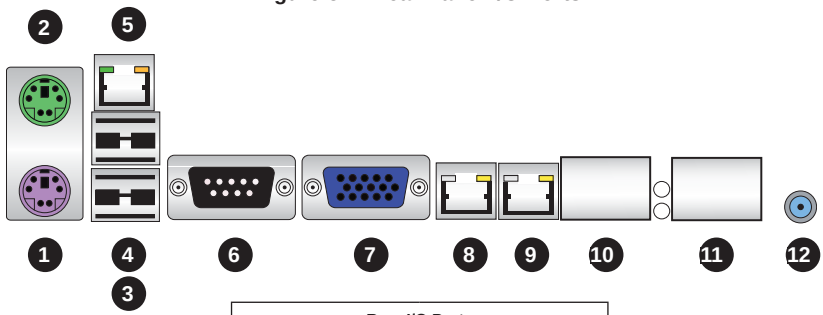
Figure 5-1. Front Control Panel Header Pins (JF1)



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. Rear Panel I/O Ports



Rear I/O Ports	
1. Keyboard	7. VGA Port
2. PS/2 Mouse	8. LAN1 (1 Gb)
3. USB0	9. LAN2 (1 Gb)
4. USB1	10. T-LAN1 (10 Gb)
5. Dedicated IPMI LAN	11. T-LAN2 (10 Gb)
6. COM1	12. UID Button

Note: only two LAN ports (#8 and #9 as shown) are included on the 6016T-6RF+. The 6016T-6RFT+ also includes the 10 Gb T-LAN ports.

5-5 Installing Memory

Note: Check the Supermicro web site for recommended memory modules.

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Installing DIMMs

1. Insert the desired number of DIMMs into the memory slots, starting with slot P1-DIMM1A. For best performance, install memory modules of the same type and same speed in the slots as indicated in the tables below.

2. Insert each DIMM vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly (see Figure 5-5).

3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules

Memory Support

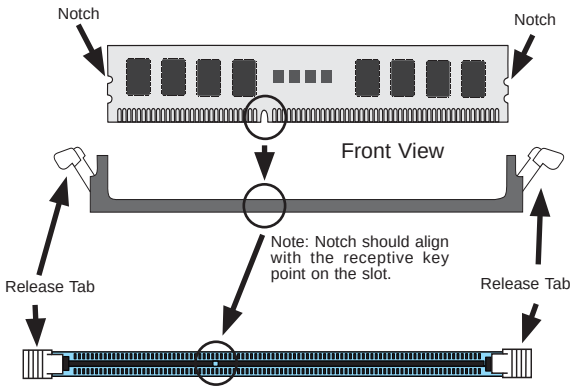
The X8DTU-6TF+/X8DTU-6F+ supports up to 192 GB of registered ECC or 48 GB of unbuffered ECC/non-ECC DDR3-1333/1066/800 SDRAM in 18 slots

Note: Memory speed support depends on the type of CPU used.

Figure 5-3. Installing DIMM into Slot

To Install: Insert module vertically and press down until it snaps into place. Pay attention to the alignment notch at the bottom.

To Remove:
Use your thumbs to gently push the release tabs near both ends of the module. This should release it from the slot.



Top View of DDR3 Slot

Memory Population for Optimal Performance With One CPU (CPU1) Installed									
P1-DIMMs	**To Populate P1-DIMMs**								
	Branch 0			**Branch 1**			**Branch 2**		
3 DIMMs	P1-1A			P1-2A			P1-3A		
6 DIMMs	P1-1A	P1-1B		P1-2A	P1-2B		P1-3A	P1-3B	
9 DIMMs (RDIMMs only) (**Note**)	P1-1A	P1-1B	P1-1C	P1-2A	P1-2B	P1-2C	P1-3A	P1-3B	P1-3C
Note: Max. of 6 UDIMM modules are supported by a CPU.									

Memory Population for Optimal Performance With One CPU (CPU2) Installed									
P2-DIMMs	**To Populate P2-DIMMs**								
	Branch 0			**Branch 1**			**Branch 2**		
3 DIMMs	P2-1A			P2-2A			P2-3A		
6 DIMMs	P2-1A	P2-1B		P2-2A	P2-2B		P2-3A	P2-3B	
9 DIMMs (RDIMMs only (**Note**)	P2-1A	P2-1B	P2-1C	P2-2A	P2-2B	P2-2C	P2-3A	P2-3B	P2-3C
Note: Max. of 6 UDIMM modules are supported by a CPU.									

Memory Population for Optimal Performance With Two CPUs Installed						
	CPU 1 (To Populate P1-DIMMs)			**CPU 2 (To Populate P2-DIMMs)**		
	Branch 0	**Branch 1**	**Branch 2**	**Branch 0**	**Branch 1**	**Branch 2**
6 DIMMs	P1-1A	P1-2A	P1-3A	P2-1A	P2-2A	P2-3A
12 DIMMs	P1-1A/1B	P1-2A/2B	P1-3A/3B	P2-1A/1B	P2-2A/2B	P2-3A/3B
18 DIMMs (For RDIMMs only)*	P1-1A/1B/1C	P1-2A/2B/2C	P1-3A/3B/3C	P2-1A/1B/1C	P2-2A/2B/2C	P2-3A/3B/3C
***Max. of 6 UDIMM modules are supported by a CPU.**						

Memory Support for 5500 Processor(s)

RDIMM Population w/5500 Processors Installed				
DIMM Slots per Channel	**DIMMs Populated per Channel**	**DIMM Type (Reg.= Registered)**	**Speeds (in MHz)**	**Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)**
3	1	Reg. DDR3 ECC	800,1066,1333	SR or DR
3	1	Reg. DDR3 ECC	800,1066	QR
3	2	Reg. DDR3 ECC	800,1066	Mixing SR, DR
3	2	Reg. DDR3 ECC	800 **(Note)**	Mixing SR, DR, QR
3	3	Reg. DDR3 ECC	800 **(Note)**	Mixing SR, DR
Note: 1066 RDIMMs will run at 800 MHz (-BIOS automatic downgrading)				

UDIMM Population with 5500 Processors Installed				
DIMM Slots per Channel	**DIMMs Populated per Channel**	**DIMM Type (Unb.= Unbuffered)**	**Speeds (in MHz)**	**Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)**
3	1	Unb. DDR3 ECC/Non-ECC	800,1066,1333	SR or DR
3	2	Unb. DDR3 ECC/Non-ECC	800,1066	Mixing SR, DR
3	3	Not available	Not available	Not available

Memory Support for 5600 Processor(s)

- 1.5V DIMMs

1.5V RDIMM Population with 5600 Processors Installed				
DIMM Slots per Channel	**DIMMs Populated per Channel**	**DIMM Type (Reg.=Registered)**	**Speeds (in MHz)**	**Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)**
3	1	Reg. DDR3 ECC	800,1066,1333	SR or DR
3	1	Reg. DDR3 ECC	800,1066 (Note 1)	QR
3	2	Reg. DDR3 ECC	800,1066, 1333	Mixing SR, DR
3	2	Reg. DDR3 ECC	800 (Note 2)	Mixing SR, DR, QR
3	3	Reg. DDR3 ECC	800 (Note 2)	Mixing SR, DR

Note 1: 1333 MHz RDIMMs will run at 1066 MHz (BIOS automatic downgrading).
Note 2: 1333/1066 MHz RDIMMs will run at 800 MHz (BIOS automatic downgrading).
Note 3: MIxing of 1.35V and 1.5V DIMMs is not recommended.

1.5V UDIMM Population with 5600 Processors Installed				
DIMM Slots per Channel	**DIMMs Populated per Channel**	**DIMM Type (Unb.= Unbuffered)**	**Speeds (in MHz)**	**Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)**
3	1	Unb. DDR3 ECC/Non-ECC	800,1066,1333	SR or DR
3	2	Unb. DDR3 ECC/Non-ECC	800,1066, 1333	Mixing SR, DR
3	3	Not Available	Not Available	Not Available

Note 1: 1333 MHz for two DIMMs per channel is supported when Unbuf./ECC DIMMs are used.
Note 2: MIxing of 1.35V and 1.5V DIMMs is not recommended.

Notes: Due to OS limitations, some operating systems may not show more than 4 GB of memory. Due to memory allocation to system devices, memory remaining available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional. (Refer to the Memory Availability Table on the following page for details.)

- 1.35V DIMMs

1.35V RDIMM Population with 5600 Processors Installed				
DIMM Slots per Channel	**DIMMs Populated per Channel**	**DIMM Type (Reg.=Registered)**	**Speeds (in MHz)**	**Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)**
3	1	Reg. DDR3 ECC	800,1066,1333	SR or DR
3	1	Reg. DDR3 ECC	800 (Note 1)	QR
3	2	Reg. DDR3 ECC	800,1066 (Note 2)	Mixing SR, DR
3	2	Reg. DDR3 ECC	800 (Note 3)	Mixing SR, DR, QR
3	3	Not Available	Not Available	Not Available

Note 1: 1333/1066 MHz QR RDIMMs will run at 800 MHz (-BIOS automatic downgrading).
Note 2: 1333 MHz SR/DR RDIMMs will run at 800 MHz (-BIOS automatic downgrading).
Note 3: 1333/1066 MHz SR/DR/QR RDIMMs will run at 800 MHz (-BIOS automatic downgrading).
Note 4: MIxing of 1.35V and 1.5V DIMMs is not recommended.

1.35V UDIMM Population with 5600 Processors Installed				
DIMM Slots per Channel	**DIMMs Populated per Channel**	**DIMM Type (Unb.= Unbuffered)**	**Speeds (in MHz)**	**Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)**
3	1	Unb. DDR3 ECC	800,1066,1333	SR or DR
3	2	Unb. DDR3 ECC	800,1066	Mixing SR, DR
3	3	Not Available	Not Available	Not Available

Note 1: 1333 MHz for two DIMMs per channel is supported when Unbuf./ECC DIMMs are used.
Note 2: MIxing of 1.35V and 1.5V DIMMs is not recommended.

Possible System Memory Allocation & Availability		
System Device	Size	Physical Memory Remaining (4 GB Total System Memory)
Firmware Hub flash memory (System BIOS)	1 MB	3.99
Local APIC	4 KB	3.99
Area Reserved for the chipset	2 MB	3.99
I/O APIC (4 Kbytes)	4 KB	3.99
PCI Enumeration Area 1	256 MB	3.76
PCI Express (256 MB)	256 MB	3.51
PCI Enumeration Area 2 (if needed) -Aligned on 256-MB boundary-	512 MB	3.01
VGA Memory	16 MB	2.85
TSEG	1 MB	2.84
Memory available to System BIOS & OS applications		2.84

5-6 Adding PCI Cards

PCI Expansion Slots

The X8DTU-6TF+/X8DTU-6F+ has one Universal PCI slot. Riser cards installed to the system allow you to add PCI expansion cards (see below). The SC819TQ-R700U chassis can support the use of two standard size (full-height, full-length) expansion cards and one low-profile (5.6" length) expansion card (with pre-installed riser cards).

PCI Card Installation

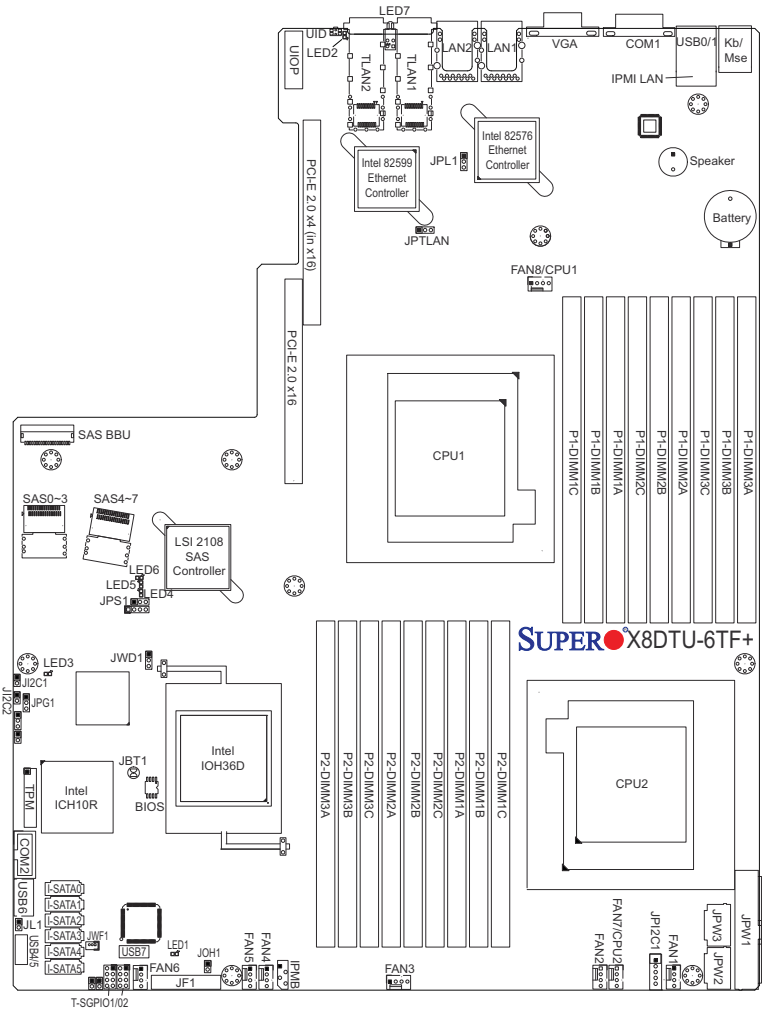
Before installing a PCI add-on card, make sure you power off the system first. Begin by removing the top chassis cover. Two riser cards should be pre-installed into the system. Remove the screws that secure the riser cards to the rear of the chassis then lift the riser card assembly from the chassis. Insert the PCI card into the riser card slot, pushing down with your thumbs evenly on both sides of the card - note that the add-on card attaches to the riser card with a single screw. After the card has been installed, reinsert the riser card back into the expansion slot on the board, then secure it with the same screws you removed previously. Finish by replacing the chassis cover.

PCI Slot/Card Configurations

Riser Card	Expansion Card Supported
RSC-R1UU-2E8 (left side)	1x UIO card and 1x PCI-E x16 card
RSC-R1UU-E8R+ (right side)	2x low-profile PCI-E x8 cards

5-7 Serverboard Details

Figure 5-4. SUPER X8DTU-6TF+/ Layout



Notes:

TLAN1 and TLAN 2 are included on the X8DTU-6TF+ (6016T-6RFT+) only.

Jumpers not indicated are for test purposes only.

When LED1 (the onboard power indicator) is on, system power is on. Unplug the power cable before installing or removing any components.

X8DTU-6TF+/X8DTU-6F+ Quick Reference

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-9
JI²C1/JI²C2	SMB to PCI-E Slots	Open (Disabled)
JPG1	VGA Enable	Pins 1-2 (Enabled)
JPL1	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPS1	SAS Enable/Disable	Pins 1-2 (Enabled)
JPTLAN	TLAN1/2 Enable/Disable	Pins 1-2 (Enabled)
JWD1	Watch Dog	Pins 1-2 (Reset)

Connector	Description
COM1/COM2	COM1/COM2 Serial Port/Header
FAN 1~8	CPU//System Fan Headers (Fans 7 & 8: CPU Fans)
IPMB	4-pin External BMC I²C Header (for IPMI Card)
IPMI LAN	Dedicated IPMI LAN
I-SATA 0~5	Intel SB SATA Connectors 0~5
JF1	Control Panel Header
JL1	Chassis Intrusion
JOH1	Overheat/Fan Fail LED
JPI²C	Power Supply SMBbus I²C Header
JPTM1	Trusted Platform Support Header
JPW1	ATX 24-Pin Power Connector
JPW2/JPW3	12V 8-Pin Power Connectors
JWF1	SATA DOM (Disk On Module) Power Header
LAN1/2	Gigabit Ethernet Ports 1/2
SAS0~3, 4~7	SAS Ports
SAS BBU	SAS Battery Backup Unit (p/n: BTR-0018L-0000-LSI)
TLAN1/TLAN2	10 Gb Ethernet Ports (X8DTU-6TF+ only)
T-SGPIO 1/2	Serial_Link General Purpose I/O Headers
USB 0/1	Back Panel USB 0/1 Ports
USB4/5, 6, 7	Front Panel Accessible USB Headers (USB6: Type A port)
UID	UID (Unit Identifier) Button
UIOP	Universal I/O Add-on Card Power Connection

Quick Reference table continued on next page.

LED	Description
LED1	Power LED
LED2	UID LED
LED3	BMC Heartbeat LED
LED4	SAS Activity LED
LED5	SAS Heartbeat LED
LED6	SAS Error LED
LED7	UID LED

5-8 Connector Definitions

ATX Power Connector

The primary ATX power supply connector meets the SSI EPS 12V specification. Make sure that the orientation of the connector is correct. See the table on the right for pin definitions.

ATX Power 24-pin Connector Pin Definitions

Pin#	Definition	Pin #	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	COM	3	COM
16	PS_ON	4	+5V
17	COM	5	COM
18	COM	6	+5V
19	COM	7	COM
20	Res (NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	COM	12	+3.3V

Processor Power Connectors

JPW2 and JPW3 must also be connected to the power supply to provide power for the processor(s). See the table on the right for pin definitions.

Processor Power Pin Definitions (JPW2/JPW3)

Pins	Definition
1 through 4	Ground
5 through 8	+12V

Warning: To prevent damage to your power supply or serverboard, please use a power supply that contains a 24-pin and two 8-pin power connectors. Be sure to connect these power connectors to the 20-pin and the two 8-pin power connectors on your serverboard for adequate power supply to your system. Failure to do so will void the manufacturer warranty on your power supply and serverboard.

NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

NMI Button Pin Definitions (JF1)

Pin#	Definition
19	Control
20	Ground

Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

Power LED Pin Definitions (JF1)

Pin#	Definition
15	Vcc
16	Control

HDD LED/UID Switch

The HDD LED/UID switch connections are located on pins 13/14 of JF1. Attach an LED cable to display HDD activity. This connection can also be used as a front panel UID (Unit Identifier) switch. The UID LED on pin 7 of JF1 works in conjunction with this UID switch. When the user presses and releases the UID switch, the UID LED will be turned on or off to indicate the location of the unit.

HDD/UID Switch Pin Definitions (JF1)

Pin#	Definition
13	UID Signal/3.3V SB
14	HD Active

NIC1 LED

The NIC1 (Network Interface Controller) LED connection is located on pins 11 and 12 of JF1. Attach the NIC1 LED cable to display network activity. Refer to the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)

Pin#	Definition
11	Vcc
12	Ground

NIC2 LED

The NIC2 (Network Interface Controller) LED connection is located on pins 9 and 10 of JF1. Attach the NIC2 LED cable to display network activity. Refer to the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)

Pin#	Definition
9	Vcc
10	Ground

Overheat (OH)/Fan Fail/PWR Fail/ UID LED

Connect an LED to pins 7 and 8 of JF1 to provide advanced warning of chassis overheating or fan failure. These pins also work with the front UID indicator, which will activate as either a solid or flashing blue LED depending on whether the LED was activated via IPMI or the UID button. Refer to the tables on the right for pin definitions and status indicators.

OH/Fan Fail/ PWR Fail/Blue_UID LED Pin Definitions (JF1)

Pin#	Definition
7	Blue_LED Cathode (UID)
8	OH/Fan Fail/PWR Fail/UID LED

OH/Fan Fail/PWR Fail LED Status

Pin 7	Pin 8	Red LED	Blue LED
Low	High	On: OH/FF/Pwr Fail (Solid On: OH Fast Blinking: Fan Fail Slow Blinking: Pwr Fail)	Off
High	Low	Off (System normal)	On UID LED
High	High	Off	Off

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

Power Fail LED Pin Definitions (JF1)

Pin#	Definition
5	Vcc
6	Ground

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to the hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)

Pin#	Definition
3	Reset
4	Ground

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, depress the button for at least 4 seconds. Refer to the table on the right for pin definitions.

Power Button Pin Definitions (JF1)

Pin#	Definition
1	PW_ON
2	Ground

Serial Ports

The COM1 serial port is located on the I/O backplane. COM2 is a header on the serverboard (see serverboard layout for location). See the table on the right for pin definitions.

Serial Port Pin Definitions

Pin #	Definition	Pin #	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Note: Pin 10 is included on the header but not on the port. NC indicates no connection.

Universal Serial Bus Ports

Two Universal Serial Bus ports are located on the I/O backplane. USB0 is the bottom connector and USB1 is the top connector. USB4/5/7 are headers provided for front panel access (cables not included) and USB6 is a Type A port (see board layout for locations). See the table on the right for pin definitions.

USB Ports (USB0/1/6)

Pin#	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	NA

Front Panel USB Pin Definitions

USB 2/3 Pin #	USB 2/3 Definition	USB 4/5 Pin #	USB 4/5 Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	Key	5	NC

(NC= No connection)

Internal USB Pin Definitions (USB 7)

Pin #	Definition	Pin #	Definition
1	PWR	2	Ground
3	USBD-	4	Ground
5	USBD+	6	Ground
7	Ground	8	Ground
9	NA	10	Ground

Fan Headers

The board has eight fan headers designated Fan1 through Fan8. FAN1 through FAN6 are for chassis/system fans while FAN7 and FAN8 are used for CPU heatsink fans. Their speed is controlled via Thermal Management with a BIOS setting. See the table on the right for pin definitions.

Fan Header Pin Definitions

Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer
4	PWM Control

Chassis Intrusion

A Chassis Intrusion header is located at JL1. Attach the appropriate cable to inform you of a chassis intrusion.

Chassis Intrusion Pin Definitions

Pin#	Definition
1	Intrusion Input
2	Ground

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse ports are located beside the USB ports. See the table on the right for pin definitions.

PS/2 Keyboard and Mouse Ports Pin Definitions

Pin#	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Overheat/Fan Fail LED

Connect an LED to the JOH1 header to provide warning of a chassis overheating or fan fail condition. See the table on the right for pin definitions.

Overheat/Fan Fail LED Pin Definitions

Pin#	Definition
1	+5V
2	Active

OH/Fan Fail LED Status

State	Message
Solid	Overheat
Blinking	Fan Fail

SGPIO

The two headers labeled T-SGPIO-1 and T-SGPIO-2 are for SGPIO (Serial General Purpose Input/Output). SGPIO supports serial link interfaces for onboard SATA and SAS ports. Connect the appropriate cables from the backplane to the SGPIO1 and SGPIO2 headers to utilize SATA/SAS management functions on your system.

SGPIO Pin Definitions

Pin#	Definition	Pin #	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	NC	8	NC

Note: NC indicates no connection.

IPMB

A System Management Bus header for IPMI 2.0 is located at IPMB. Connect the appropriate cable here to use the IPMB I²C connection on your system.

IPMB Pin Definitions

Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

DOM Power Connector

A power connector for SATA DOM (Disk_On_Module) Devices is located at JWF1. Connect the appropriate cable here to provide power support for your DOM devices.

DOM PWR Pin Definitions

Pin#	Definition
1	+5V
2	Ground
3	Ground

UID Buttons

There are two Unit Identification (UID) buttons on the serverboard. The Front Panel UID Switch connects to pin 13 of JF1. The Rear UID Switch (SW1) is located next to the last LAN port. Pushing the UID switch on the Front Control Panel will illuminate both the Rear UID and the Control Panel UID indicators. Push the either switch again to turn off both indicators. These UID indicators provide easy identification of a system that may be in need of service.

LAN (Ethernet) Ports

Two Ethernet ports (designated LAN1 and LAN2) are located beside the VGA port on the I/O backplane. A dedicated IPMI LAN port is also located above USB1. These ports accept RJ45 type cables.

UIO Power Connector

A Universal I/O power connector (UIOP) is located next to the UID button. This is a required connection for the riser cards installed on the serverboard. Connect the UIOP connector to the power supply to provide adequate power to the installed add-on cards installed for them to function properly. See the table on the right for pin definitions.

Universal I/O Power Connector Pin Definitions

Pin#	Definition	Pin #	Definition
B1	P5V	A1	P3V3
B2	P5V	A2	P3V3
B3	P5V	A3	P3V3
B4	P5V	A4	P3V3
B5	P5V	A5	P3V3
B6	P5V	A6	P3V3
B7	P5V	A7	P3V3
B8	P5V	A8	P3V3
B9	P5V	A9	P3V3
B10	P5V	A10	P3V3
B11	N12V	A11	P3V3
B12	P3V3 STBY	A12	P3V3
B13	P3V3 STBY	A13	P12V
B14	Ground	A14	P12V
B15	Ground	A15	P12V
B16	Ground	A16	P12V
B17	Ground	A17	P12V
B18	Ground	A18	Ground

10Gb TLAN Ports and SFP+ Devices (X8DTU-6TF+)

Two 10Gb Ethernet ports (TLAN1/2) with Small_Form Factor Pluggable Device support are located at on the I/O backplane on the X8DTU-6TF+.

SAS BBU Connector

A SAS Battery Backup Unit (BBU) connector is located near the SAS ports. In the event of a power outage, the BBU unit will provide backup power for SAS connection use.

(Part#: BTR-0018L-0000-LSI)

Trusted Platform Module Header

A Trusted Platform Module header (JTPM) is located next to the COM2 connection. This header provides TPM support to ensure data integrity and system security. Refer to the table on the right for pin definitions.

Trusted Platform Module (TPM) Pin Definitions

Pin#	Definition	Pin #	Definition
1	LPC Clock	2	GND
3	LPC FRAME#	4	Key
5	LPC Reset#	6	+5V (X)
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDAT
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN (X)
19	LPCPD#	20	LDRQ# (X)

Notes:

X indicates TPM does not use the signals.

SCL and SDAT are I^2C bus clock and data.

Power SMB (I^2C) Connector

The Power System Management Bus (I^2C) Connector (JPI^{2}C) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

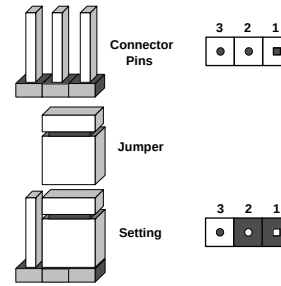
PWR SMB Pin Definitions

Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V

5-9 Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.



Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

Note: *Do not use the PW_ON connector to clear CMOS.*

VGA Enable/Disable

JPG1 allows you to enable or disable the onboard VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings. The default setting is enabled.

VGA Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

LAN/TLAN Enable/Disable

Change the setting of jumper JPL1 to enable or disable the LAN1 and LAN2 onboard Ethernet (RJ45) ports and JPTLAN to enable the 10 Gb LAN ports on the X8DTU-6TF+. See the table on the right for jumper settings. The default setting is enabled.

LAN Enable/Disable Jumper Settings

Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

(10 Gb) TLAN Enable/Disable Jumper Settings (X8DTU-6TF+)

Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Watch Dog Enable/Disable

JWD1 controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application "hangs". Pins 1-2 will cause WD to reset the system if an application hangs. Pins 2-3 will generate a non-maskable interrupt signal for the application that has hung. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

Note: When enabled, the user needs to write their own application software to disable the Watch Dog Timer.

Watch Dog Jumper Settings

Jumper Setting	Definition
Pins 1-2	Reset
Pins 2-3	NMI
Open	Disabled

SMB to PCI Express Slots

Jumpers JI^{2}C1 and JI^{2}C2 allow you to connect the System Management Bus (I^{2}C) to the PCI Express slots. Both jumpers must have the same setting to function correctly. The default setting is disabled. See the table on the right for jumper settings.

SMB to PCI-Exp Jumper Settings

Jumper Setting	Definition
Closed	Enabled
Open	Disabled

SAS Enable

Use JPS1 to enable or disable SAS support on the serverboard. See the table on the right for jumper settings.

SAS Enable/Disable Jumper Settings

Jumper Setting	Definition
Pins 1-2	SAS Enabled
Pins 2-3	SAS Disabled

5-10 Onboard Indicators

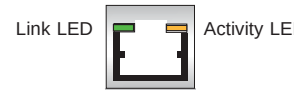
LAN LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gigabit LAN port, one LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

LAN LED Connection Speed Indicator	
LED Color	Definition
Off	No connection or 10 Mb/s
Green	100 Mb/s
Amber	1 Gb/s

Dedicated IPMI LAN LEDs

In addition to LAN1 and LAN2, a dedicated IPMI LAN is located on the I/O backpanel. The amber LED indicates activity, while the Link LED indicates the speed of the connection. See the tables at right for more information.



IPMI LAN Activity Indicator		
Color	Status	Definition
Amber	Flashing	Active

IPMI LAN Indicator	
LED Color	Definition
Off	No Connection or 10 Mb/s
Green	100 Mb/s

LE1

An Onboard Power LED is located at LE1 on the serverboard. When this LED is lit the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components. See the table at right for more information.

Onboard PWR LED Indicator	
LED Color	Definition
Off	System Off/Power cable not connected
Green	System On

UID LED

The rear UID LED is located at the I/O backplane. This LED is used in conjunction with the rear UID switch to provide easy identification of a system that might be in need of service.

UID LED		
Color/State	OS	Status
Blue: On	Windows	Unit Identified
Blue: Blinking	Linux	Unit Identified

BMC Heartbeat LED

A BMC heartbeat LED is located at LED3 on the serverboard. When LED3 is blinking, the BMC is functioning normally.

BMC Heartbeat LED	
State	Definition
Blinking	BMC: Normal

SAS Activity & SAS Heartbeat LEDs

A SAS Activity LED (LED 4) and a SAS Heartbeat LED (LED 5) are provided on the serverboard. When LED 4 is blinking, the SAS connections are active. When LED 5 blinks, SAS is functioning normally.

SAS Activity & SAS Heartbeat LEDs		
LED	State	Definition
LED 4	Blinking	SAS Active
LED 5	Blinking	SAS Normal

SAS Error LED

A SAS Error LED is designated LED6 on the serverboard. When LED6 is on, a SAS error has occurred. See the table at right for more information.

SAS Error LED		
LED	State	Definition
LED 6	On	SAS Error Occurred

TLAN LED (X8DTU-6TF+ only)

A TLAN (10GbLAN) LED is located at LED7. When this LED is yellow, the LAN port is connected and/or active. When this LED is green, the LAN port is connected and/or active. Please note that these LAN ports are available on the X8DTU-6TF+ only. See the tables at right for more information.

TLAN LED: Yellow LED States	
State	Definition
Yellow Blinking	Gigabit LAN Active
Yellow Solid On	Gigabit LAN Link (GLAN Connected)

TLAN LED: Green LED States	
Color/State	Definition
Green Blinking	10 Gb LAN Active
Green On	10 Gb LAN Link (10 Gb LAN connected)

5-11 SATA Port Connections

SATA Ports

There are six Serial ATA Ports (I-SATA0~I-SATA 5) on the serverboard, which are supported by the Intel ICH10R South Bridge See the table on the right for pin definitions for the onboard SATA ports.

SATA Port Pin Definitions

Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

SAS Ports

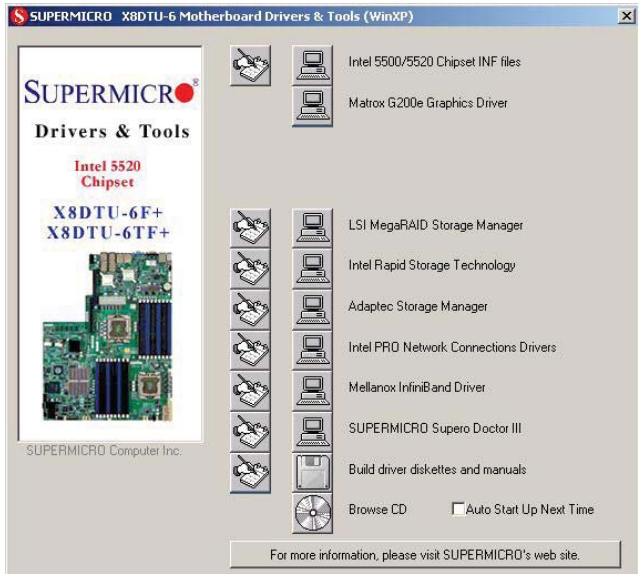
SAS Ports 0~3 and 4~7 provide Serial-Attached SCSI connections. These SAS ports are supported by the LSI 2108 controller. See the table on the right for pin definitions for the onboard SAS ports.

SAS Port Pin Definitions

Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

5-12 Installing Software

After the hardware has been installed, you should first install the operating system and then the drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your serverboard.



Driver/Tool Installation Display Screen

Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents of the CD.

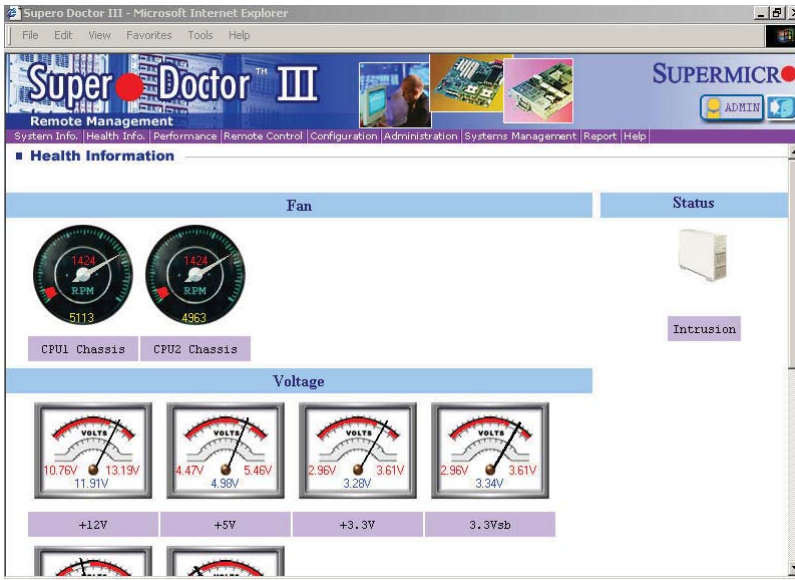
Supero Doctor III

The Supero Doctor III program is a Web base management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CDROM that came with your serverboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

Note: The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

Note: When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

Supero Doctor III Interface Display Screen (Health Information)



Supero Doctor III Interface Display Screen (Remote Control)

Supero Doctor III - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Super Doctor III
Remote Management
SUPERMICRO
ADMIN
System Info. Health Info. Performance Remote Control Configuration Administration Systems Management Report Help
Remote Control
Graceful Power Control
Open Console
Power Control
Enter
Comm.
Graceful power control
Supero Doctor III allows a user to inform the OS to reboot or shut down within a specified time (the default is 30 seconds). Before the system reboots or shuts down, it's allowed to cancel the action.
Requirements
Keep Supero SD3Service Daemon running at all times on this system.
Provide TCP/IP connectivity.
Power control

Note: SD III Software Revision 1.0 can be downloaded from our Web Site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download SDIII User's Guide at: http://www.supermicro.com/manuals/other/SDIII_User_Guide.pdf. For Linux, we will still recommend Supero Doctor II.

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC819TQ chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the next step.

Tools Required: The only tool you will need to install components and perform maintenance is a Philips screwdriver.

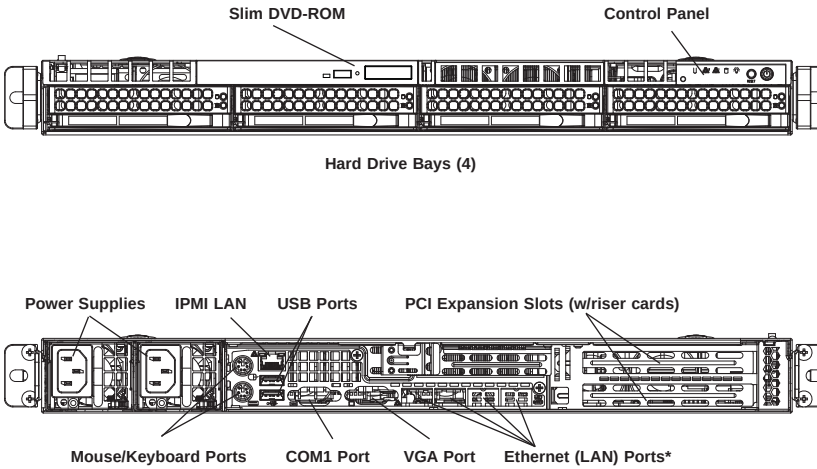
6-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Figure 6-1. Chassis: Front and Rear Views



*The 6016T-6RF+ has two 1 Gb Ethernet ports while the 6016T-6RFT+ has two 1 Gb and two 10 Gb ports.

6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. These wires have been bundled together as a ribbon cable to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Setup."

6-3 System Fans

Five 4-cm heavy duty counter-rotating fans provide the cooling for the 6016T-6RFT+/6016T-6RF+. Each fan unit is actually made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and works to dampen vibration levels.

It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components. See Figure 6-2.

System Fan Failure

Fan speed is controlled by system temperature via a BIOS setting. If a fan fails, the remaining fan will ramp up to full speed and the overheat/fan fail LED on the control panel will turn on. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan).

Remove the top chassis cover while the system is still running to determine which of the fans has failed. Then power down the system before replacing a fan. Removing the power cord(s) is also recommended as a safety precaution.

Replacing System Fans

1. After determining which fan has failed, turn off the power to the system.
2. Unplug the fan cable from the serverboard and remove the failed fan from the chassis.
3. Replace the failed fan with an identical 4-cm, 12 volt fan (available from Supermicro: p/n FAN-0086L4).
4. Push the new fan into the vacant space in the housing while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans.
5. Reposition the fan housing back over the two mounting posts in the chassis, then reconnect the fan wires to the same chassis fan headers you removed them from.
6. Power up the system and check that the fan is working properly and that the LED on the control panel has turned off.
7. Finish by replacing the chassis cover.

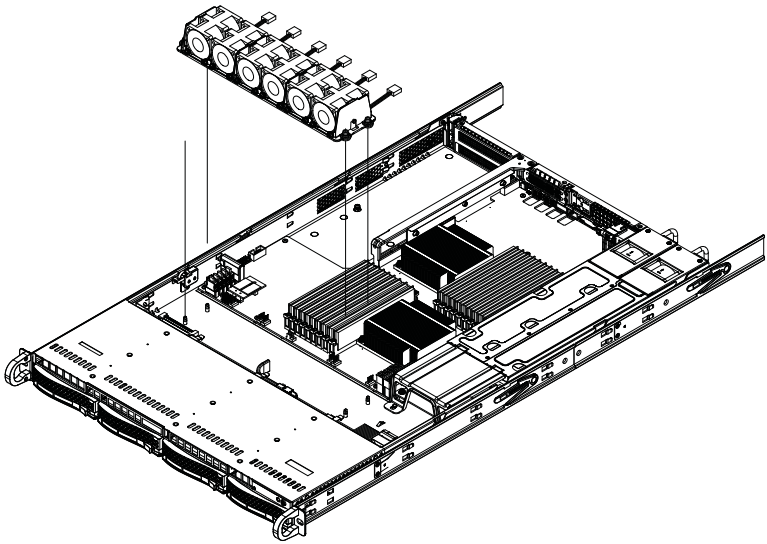


Figure 6-2. System Cooling Fans

Accessing the Drive Bays

Hard Drives: Because of their hotswap capability, you do not need to access the inside of the chassis or power down the system to install or replace the SAS/SATA drives. Proceed to the next section for instructions.

DVD-ROM Drive: For installing/removing a DVD-ROM drive, you will need to gain access to the inside of the 6016T-6RFT+/6016T-6RF+ by removing the top cover of the chassis. Proceed to the "DVD-ROM Drive Installation" section later in this chapter for instructions.

Note: Only a "slim" DVD-ROM drive will fit into the 6016T-6RFT+/6016T-6RF+.

Warning! Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro Web site at http://www.supermicro.com/products/nfo/storage.cfm

Hard Drive Installation

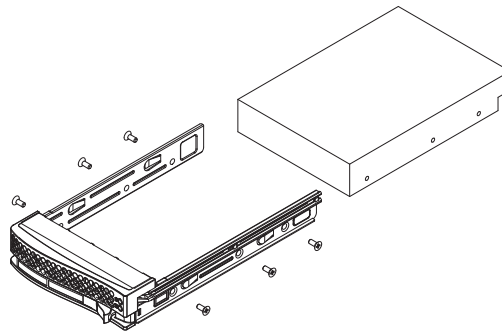
The hard drives are mounted in drive carriers to simplify their installation and removal from the chassis. System power may remain on when removing carriers with drives installed. These carriers also help promote proper airflow for the drive bays. For this reason, even empty carriers without drives installed must remain in the chassis.

Mounting a Hard Drive in a Drive Carrier

1. Insert a drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.

2. Secure the drive to the carrier with six screws, as shown in Figure 6-3.

Figure 6-3. Mounting a Drive in a Carrier



Use caution when working around the hard drive backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

Important: Regardless of how many hard drives are installed, all drive carriers must remain in the drive bays to maintain proper airflow.

Installing/Removing a Hard Drive

1. To remove a carrier, push the release button located beside the drive LEDs.

2. Swing the colored handle fully out and use it to pull the unit straight out (see Figure 6-4).

Note: Your operating system must have RAID support to enable the hot-plug capability of the hard drives.

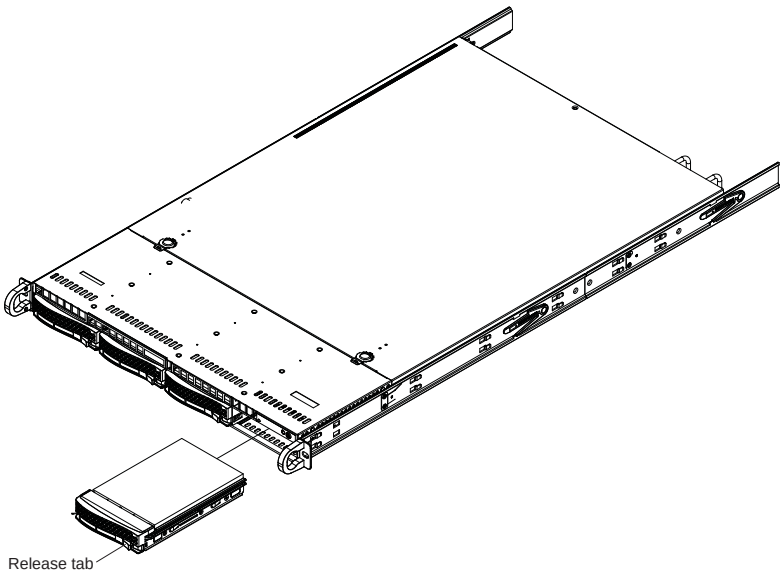


Figure 6-4. Removing a Drive from the Server

Hard Drive Backplane

The hard drives plug into a backplane that provides power and drive ID. A RAID controller can be used with the backplane to provide data security. The operating system you use must have RAID support to enable the hot-swap capability of the drives. The backplane is already preconfigured, so there are no jumpers or switches present on it.

DVD-ROM Drive Installation

The top cover of the chassis must be opened to gain full access to the DVD-ROM drive bay. The 6016T-6RFT+/6016T-6RF+ accomodates only slim DVD-ROM drives. Side mounting brackets are needed to mount a slim DVD-ROM drive in the 6016T-6RFT+/6016T-6RF+ server. You must power down the system before installing or removing a DVD-ROM drive.

Removing the Chassis Cover

1. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click").

2. Depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

Removing/Installing a Drive

1. With the chassis cover removed, unplug the power and data cables from the drive you want to remove.

2. Locate the locking tab at the rear of the drive. It will be on the left side of the drive when viewed from the front of the chassis.

3. Pull the tab away from the drive and push the drive unit out the front of the chassis.

4. Add a new drive by following this procedure in reverse order. You may hear a faint *click* of the locking tab when the drive is fully inserted.

5. Remember to reconnect the data and power cables to the drive before replacing the chassis cover and restoring power to the system.

6-4 Power Supply

The SuperServer 6016T-6RFT+/6016T-6RF+ has a 700 watt redundant power supply consisting of two power modules. Each power supply module has an auto-switching capability, which enables it to automatically sense and operate at a 100V - 240V input voltage.

Power Supply Failure

If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption. The PWR Fail LED will illuminate and remain on until the failed unit has been replaced. Replacement units can be ordered directly from Supermicro (part number PWS-703-P-1R). The power supply units have a hot-swap capability, meaning you can replace the failed unit without powering down the system.

Removing the Power Supply

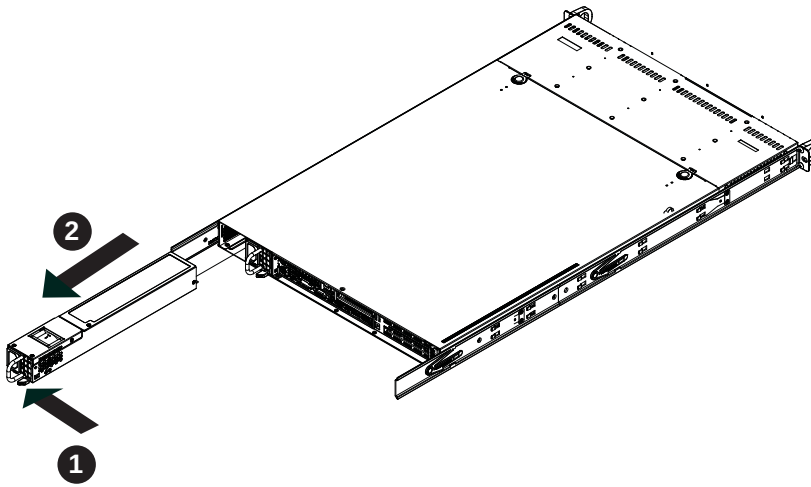
First unplug the AC power cord from the failed power supply module.

1. Depress the locking tab on the power supply module.
2. Use the handle to pull it straight out with the rounded handle (see Fig. 6-5).

Installing a New Power Supply

1. Replace the failed hot-swap unit with another identical power supply unit.
2. Push the new power supply unit into the power bay until you hear a click.
3. Secure the locking tab on the unit.
4. Finish by plugging the AC power cord back into the unit.

Figure 6-5. Removing/Replacing the Power Supply



Notes

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup Utility for the X8DTU-6F+/X8DTU-6TF+. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS Setup Utility setup screens.

Starting BIOS Setup Utility

To enter the AMI BIOS Setup Utility screens, press the <Delete> key while the system is booting up.

Note: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (**Note**: the AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text messages.)

The AMI BIOS Setup Utility uses a key-based navigation system called "hot keys". Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, arrow keys, etc.

Note: Options printed in **Bold** are default settings.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

Note: For AMI BIOS Recovery, please refer to the AMI BIOS Recovery Instructions posted on our website at http://www.supermicro.com/support/manuals/.

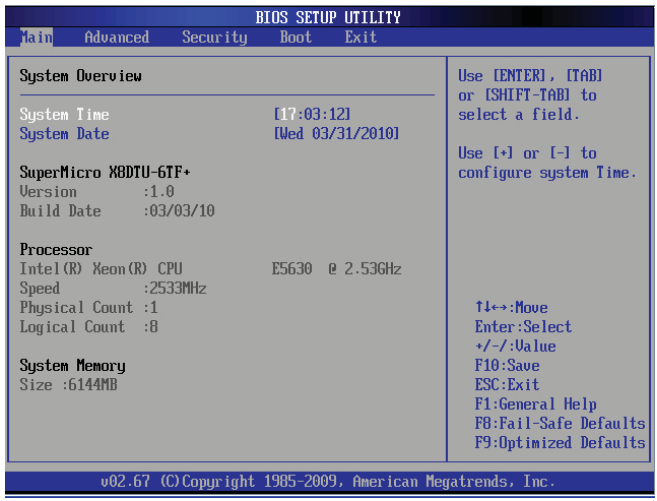
Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS Setup Utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

Warning! Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating. This is to avoid possible boot failure.

7-2 Main Setup

When you first enter the AMI BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.



System Overview: The following BIOS information will display.

System Time/System Date

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the arrow keys. Key in new values through the keyboard and press <Enter>. Press the <Tab> key to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format. (**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.)

SuperMicro X8DTU-6TF+

- **Version**: This item displays the BIOS revision used in your system.
- **Build Date**: This item displays the date when this BIOS was complete.

Processor

The AMI BIOS will automatically display the status of the processor used in your system:

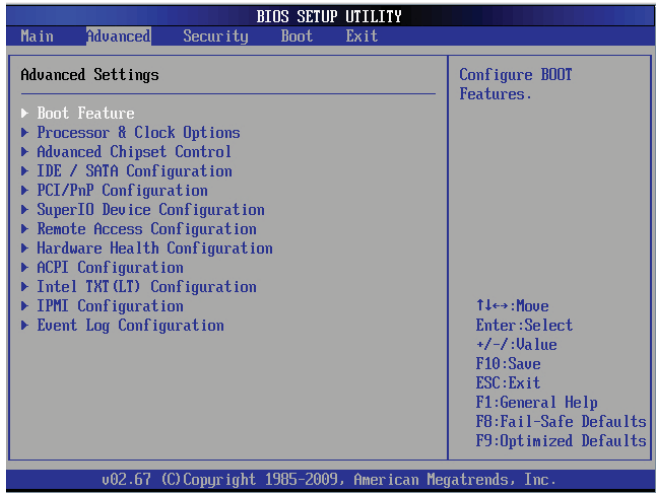
- **CPU Type**: This item displays the type of CPU used in the motherboard.
- **Speed**: This item displays the speed of the CPU detected by the BIOS.
- **Physical Count**: This item displays the number of processors installed in your system as detected by the BIOS.
- **Logical Count**: This item displays the number of CPU Cores installed in your system as detected by the BIOS.

System Memory

- **Size**: This displays the size of memory available in the system.

7-3 Advanced Setup Configurations

Use the arrow keys to select Advanced and press <Enter> to access the submenu items.



▶Boot Features

Quick Boot

If enabled, this feature will skip certain tests during POST to reduce the time needed for system boot. The options are **Enabled** and Disabled.

Quiet Boot

Use this feature to modify bootup screen display between POST messages or the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

AddOn ROM Display Mode

This sets the display mode for Option ROM. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock

This feature selects the Power-on state for the Numlock key. The options are Off and **On**.

Wait For 'F1' If Error

This forces the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

Hit 'Del' Message Display

Select Enabled to display "Press DEL to run Setup" during POST. The options are **Enabled** and Disabled.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles boot disk functions. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

Watch Dog Function

If enabled, the Watch Dog Timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

Power Button Function

If this feature is set to Instant_Off, the system will power off immediately as soon as the user hits the power button. If this feature is set to 4_Second_Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant_Off** and 4_Second_Override.

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Power-Off for the system power to remain off after a power outage. Select Power-On for the system power to turn on after a power outage. Select Last State to allow the system to resume its last state before a power outage. The options are Power-On, Power-Off and **Last State**.

▶Processor and Clock Options

This submenu displays the status of the processor used in the motherboard and allows the user to configure the Processor and Clock settings.

- **Type of the CPU**: This item displays the CPU type for the motherboard.
- **Frequency**: This item displays the CPU frequency for the motherboard.
- **CPUID**: This item displays the CPUID for the motherboard.
- **Microcode Revision**: This item displays the CPUID for the motherboard.
- **Cache L1**: This item displays the size of Cache L1 of the CPU for the motherboard.

- **Cache L2**: This item displays the size of Cache L2 of the CPU for the motherboard.
- **Cache L3**: This item displays the size of Cache L3 of the CPU for the motherboard.
- **Ratio Status**: This item displays the status of the CPU ratio.
- **Ratio Actual Value**: This item displays the actual value of the CPU ratio.

CPU Ratio

Select Manual to manually configure the CPU Ratio. Select Auto to allow the BIOS to automatically configure the CPU Ratio. The options are **Auto** and Manual.

Clock Spread Spectrum

Select Enable to enable Clock Spectrum support to allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

Hardware Prefetcher (Available when supported by the CPU)

If set to Enabled, the hardware prefetcher will prefetch streams of data and instructions from the main memory to L2 cache in the forward or backward manner to improve CPU performance. The options are Disabled and **Enabled**.

Adjacent Cache Line Prefetch (Available when supported by the CPU)

The CPU prefetches the cache line for 64 bytes if this option is set to Disabled. If this feature is set to Enabled, the CPU prefetches both cache lines for 128 bytes as comprised. The options are Disabled and **Enabled**.

MPS and ACPI MADT Ordering

This feature allows the user to configure the MPS (Multi-Processor Specifications) and ACPI (Advanced Configuration and Power Interface) settings for your motherboard. Select Modern Ordering if XP or a newer version of Windows OS is used in the motherboard. Select Legacy Ordering if 2000 or an earlier version is used. The options are **Modern Ordering** and Legacy Ordering.

Machine Checking Feature (Available when supported by the CPU.)

Select Enabled to use this feature which will allow the CPU to detect and report hardware (machine) errors via a set of model-specific registers (MSRs). The options are Disabled and **Enabled**.

Intel® Virtualization Technology (Available when supported by the CPU)

Select Enabled to use the feature of Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled. **Note**: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's web site for detailed information.

Execute-Disable Bit Capability (Available when supported by the OS and the CPU)

Set to Enabled to enable Execute Disable Bit support which will allow the processor to designate areas in the system memory where an application code can be executed and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft Web Sites for more information.)

Intel AES-NI (Available when supported by the OS and the CPU)

It set to enabled, Intel AES-NI will add new encryption features to help accelerate AES SW application and provide code authorization and signature verification to improve system performance. The default is **Enabled**. (Refer to Intel and Microsoft Web Sites for more information.)

Simultaneous Multi-Threading (Available when supported by the CPU)

Set to Enabled to use the Simultaneous Multi-Threading Technology, which will result in increased CPU performance. The options are Disabled and **Enabled.**

Active Processor Cores

Set to Enabled to use a processor's Second Core and beyond. (Please refer to Intel's web site for more information.) The options are **All,** 1 and 2.

Intel® EIST Technology

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. **Please refer to Intel's web site for detailed information.** The options are Disable (Disable GV3) and **Enable (Enable GV3)**.

Intel® TurboMode Tech (Available when Intel EIST Technology is enabled)

Select Enabled to use the TurboMode Technique to boost system performance. The options are **Enabled** and Disabled.

C1E Support

Select Enabled to use the feature of Enhanced Halt State. C1E significantly reduces the CPU's power consumption by reducing the CPU's clock cycle and voltage during a "Halt State". The options are Disabled and **Enabled**.

Intel® C-STATE Tech

If enabled, C-State is set by the system automatically to either C2, C3 or C4 state. The options are Disabled and **Enabled**.

C-State Package Limit Setting

If set to Auto, the AMI BIOS will automatically set the limit on the C-State package register. The options are **Auto**, C1, C3, C6 and C7.

C1 Auto Demotion

When enabled, the CPU will conditionally demote C3, C6 or C7 requests to C1 based on un-core auto-demote information. The options are Disabled and **Enabled.**

C3 Auto Demotion

When enabled, the CPU will conditionally demote C6 or C7 requests to C3 based on un-core auto-demote information. The options are Disabled and **Enabled.**

ACPI T State

When this feature is enabled, CPU Throttling state will be reported in the ACPI (Advanced Configuration and Power Interface) protocol. The options are **Disabled** and Enabled.

▶Advanced Chipset Control

The items included in the Advanced Settings submenu are listed below.

▶QPI and IMC Configuration

QuickPath Interconnect (QPI) is the connection between the CPU and the motherboard's I/O hub. Use this feature to modify speed and power management settings.

- **CPU Revision**: This item displays the CPU revision number.
- **Current QPI Frequency:** This item displays the current QPI frequency.
- **Current Memory Frequency:** This item displays the current CPU memory frequency.

- **Memory Reference Code:** This item displays the memory reference code for the motherboard.

- **QPI Reference Code:** This item displays the QPI reference code for the motherboard.

QPI (Quick Path Interconnect) Links Speed

QuickPath Interconnect (QPI) is the connection between the CPU and the motherboard's I/O hub. Use this feature to set data transfer speed for QPI Link connections. The options are Slow-Mode, and **Full Speed**.

QPI Frequency (Available if the item - QPI Link Speed is set to Full Speed)

This feature allows the user to select the desired QPI frequency. The options are **Auto**, 4.800 GT, 5.866GT, 6.400 GT.

QPI L0s and L1

This feature allows the user to set the QPI power state to a low setting. L0s and L1 are automatically selected by the motherboard. The options are **Disabled** and Enabled.

Memory Frequency

This feature forces a DDR3 module to run at a frequency other than what the system has detected. Select Force SPD (Serial Presence Detect) to force the module to run at a frequency specified on the SPD table. The available options are **Auto**, Force DDR-800, Force DDR-1066, Force DDR-1333 and Force SPD.

Memory Mode

If this item is set to Independent, all DIMMs are available to the operating system. If this item is set to Channel Mirroring, the motherboard maintains two identical copies of all data in memory for redundancy. If this item is set to Lockstep, the motherboard uses two areas of memory to run the same set of operations in parallel. The options are **Independent**, Channel Mirroring, and Lockstep.

Demand Scrubbing

This is a memory error-correction scheme when the Processor writes corrected data back into the memory block from where it was read by the Processor. The options are Enabled and **Disabled**.

Patrol Scrubbing

This is a memory error-correction scheme that works in the background looking for and correcting resident errors. The options are Enabled and **Disabled.**

Channel Interleave

This feature allows the user to configure the Memory Interleave settings for an onboard memory channel. The options are 1-way, 2-way, 3-way, 4-way, and **6-way**.

Bank Interleave

This feature allows the user to configure the Memory Interleave settings for an onboard memory bank. The options are 1-way, 2-way, and **4-way**.

Throttling - Closed Loop

Throttling improves reliability and reduces power in the processor by automatic voltage control during processor idle states. Available options are **Disabled** and Enabled.

Intel I/OAT

The Intel I/OAT (I/O Acceleration Technology) significantly reduces CPU overhead by leveraging CPU architectural improvements, freeing resources for more other tasks. The options are Disabled and **Enabled**.

DCA Technology (Available when Intel I/OAT is enabled)

Select Enabled to use Intel's DCA (Direct Cache Access) Technology to enhance data transfer efficiency. The options are **Enabled** and Disabled.

DCA Prefetch Delay

A DCA Prefetch is used with TOE components to prefetch data in order to shorten execution cycles and maximize data processing efficiency. Prefetching too frequently can saturate the cache directory and delay necessary cache accesses. This feature reduces or increases the frequency the system prefetches data. The options are [8], [16], [24], **[32]**, [40], [48], [56], [64], [72], [80], [88], [96], [104], [112], [120].

Intel VT-d

Select Enabled to enable Intel's Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The options are Enabled and **Disabled**.

Active State Power Management

Select Enabled to use the power management for signal transactions between the PCI Express L0 and L1 Links. Select Enabled to configure PCI-Exp. L0 and L1 Link power states. The options are **Disabled** and Enabled.

IOH PCI-E Max Payload Size

Some add-on cards perform faster with the coalesce feature, which limits the payload size to 128B; while others, with a payload size of 256B which inhibits the coalesce feature. Please refer to your add-on card user guide for the desired setting. The options are **256B** and 128B.

ME-HECI Support

Select Enabled to enable ME-HECI (Host Embedded Controller Interface) support, which will allow the Host OS to communicate directly with the Management Engine (ME) in a standard method for system management, effectively replacing the SMbus. The options are Enabled and **Disabled**.

▶South Bridge Configuration

This feature allows the user to configure the settings for the South Bridge chip.

USB Functions

This feature allows the user to decide the number of onboard USB ports to be enabled. The Options are: Disabled, 2 USB ports, 4 USB ports, 6 USB ports, 8 Ports, 10 Ports and **12 USB ports**.

USB 2.0 Controller (Available when the item: USB Functions is disabled)

This item indicates if the onboard USB 2.0 controller is activated. The default setting is **Enabled**.

Legacy USB Support

Select Enabled to use Legacy USB devices. If this item is set to Auto, Legacy USB support will be automatically enabled if a legacy USB device is installed on the motherboard, and vise versa. The settings are Disabled, Enabled and **Auto**.

Port60h/64h Emulation

Select Enabled to enable 60h/64h emulation for complete USB keyboard support for operating systems that are not compatible with USB devices. The options are Enabled and **Disabled.**

▶IDE/SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the IDE and SATA devices and displays the following items:

SATA#1 Configuration

If Compatible is selected, it sets SATA#1 to legacy compatibility mode, while selecting Enhanced sets SATA#1 to native SATA mode. The options are Disabled, Compatible and **Enhanced**.

Configure SATA#1 as (Not available when SATA#1 Configuration is disabled)

This feature allows the user to select the drive type for SATA#1. The options are **IDE,** RAID and AHCI. (When the option-RAID is selected, the item-ICH RAID Code Base will appear. When the option-AHCI is selected, the item-ICH AHCI Codebase will be available.)

ICH RAID Code Base (Available when the option-RAID is selected.)

Select Intel to enable Intel's SATA RAID firmware to configure Intel's SATA RAID settings. Select Adaptec to enable Adaptec's SATA RAID firmware to configure Adaptec's SATA RAID settings. The options are **Intel** and Adaptec.

ICH AHCI Codebase (Available when the option-AHCI is selected.)

Use this feature to select the AHCI Codebase for the ICH South Bridge. The options are BIOS Native Module and **Intel AHCI ROM**.

SATA#2 Configuration (Available when the option-IDE is selected.)

Selecting Enhanced will set SATA#2 to native SATA mode. The options are Disabled, and **Enhanced**.

IDE Detect Timeout (sec)

Use this feature to set the time-out value for the BIOS to detect the ATA, ATAPI devices installed in the system. The options are 0 (sec), 5, 10, 15, 20, 25, 30, and **35**.

Primary IDE Master/Slave, Secondary IDE Master/Slave, Third IDE Master, and Fourth IDE Master

These settings allow the user to set the parameters the slots indicated above. Press <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the submenu are listed below.

Type

Select the type of device connected to the system. The options are Not Installed, **Auto**, CD/DVD and ARMD.

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must be equipped with a 48-bit LBA mode addressing. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and **Auto**.

Block (Multi-Sector Transfer)

Block Mode boosts the IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if Block Mode is not used. Block Mode allows transfers of up to 64 KB per interrupt. Select Disabled to allow data to be transferred from and to the device one sector at a time. Select Auto to allow data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

PIO Mode

The IDE PIO (Programmable I/O) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4.

Select Auto to allow the AMI BIOS to automatically detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.

Select 0 to allow the AMI BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MB/s.

Select 1 to allow the AMI BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MB/s.

Select 2 to allow the AMI BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MB/s.

Select 3 to allow the AMI BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MB/s.

Select 4 to allow the AMI BIOS to use PIO mode 4. It has a data transfer bandwidth of 32-Bits. Select Enabled to enable 32-Bit data transfer.

DMA Mode

Select Auto to allow the BIOS to automatically detect IDE DMA mode when the IDE disk drive support cannot be determined.

Select SWDMA0 to allow the BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MB/s.

Select SWDMA1 to allow the BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MB/s.

Select SWDMA2 to allow the BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MB/s.

Select MWDMA0 to allow the BIOS to use Multi Word DMA mode 0. It has a data transfer rate of 4.2 MB/s.

Select MWDMA1 to allow the BIOS to use Multi Word DMA mode 1. It has a data transfer rate of 13.3 MB/s.

Select MWDMA2 to allow the BIOS to use Multi-Word DMA mode 2. It has a data transfer rate of 16.6 MB/s.

Select UDMA0 to allow the BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MB/s. It has the same transfer rate as PIO mode 4 and Multi Word DMA mode 2.

Select UDMA1 to allow the BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MB/s.

Select UDMA2 to allow the BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MB/s.

Select UDMA3 to allow the BIOS to use Ultra DMA mode 3. It has a data transfer rate of 44.4 MB/s.

Select UDMA4 to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 66.6 MB/s.

Select UDMA5 to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 100 MB/s.

Select UDMA6 to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 133 MB/s.

S.M.A.R.T. For Hard disk drives

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select Auto to allow the AMI BIOS to automatically detect hard disk drive support. Select Disabled to prevent the AMI BIOS from using the S.M.A.R.T. Select Enabled to allow the AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and **Auto**.

32Bit Data Transfer

Select Enable to enable the function of 32-bit IDE data transfer. The options are **Enabled** and Disabled.

▶PCI/PnP Configuration

Clear NVRAM

This feature clears the NVRAM (Non-Volatile Random Access Memory) during system boot. The options are **No** and Yes.

Plug & Play OS

Selecting Yes allows the OS to configure Plug & Play devices. (This is not required for system boot if Plug & Play is supported by your OS.) Select **No** to allow the AMI BIOS to configure all devices in the system.

PCI Latency Timer

This feature sets the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

PCI Cache Line Size

This feature sets the cache line size of each PCI device installed on a PCI bus. The options are 16, 32, **64**, and 128 (MB).

PCI IDE BusMaster

When enabled, the BIOS uses PCI bus mastering for reading/writing to IDE drives. The options are Disabled and **Enabled.**

SXB1 PCI-E 2.0 x16/x8 Option ROM/SXB3 PCI-E 2.0 x8 Option ROM/SXB2 PCI-E 2.0 x8/x4 Option ROM/SXB2 PCI-E 2.0 x4 Option ROM

Select Enabled to enable PCI-E slots indicated above. It can also enable Option ROMs specified to boot computer using a network interface from these slots. The options are **Enabled** and Disabled.

Onboard LAN Option ROM Select

Select iSCSI to use iSCSI Option ROMs to boot the computing using a network device. Select iSCSI to use PXE Option ROMs to boot the computing using a network device. The options are iSCSI and **PXE**.

Load Onboard LAN1~LAN4 Option ROM

Select Enabled to enable the onboard LAN1, LAN2, LAN3 or LAN4 Option ROM. This is to boot computer using a network interface. The options are Enabled and **Disabled.**

Boot Graphics Adapter Priority

This feature allows the user to specify which graphics controller to be used as the primary boot graphics controller. The options are **Onboard VGA**, SXB1 PCI-E 2.0 x16, and Offboard VGA**.**

▶Super IO Device Configuration

Serial Port1 Address/ Serial Port2 Address

This option specifies the base I/O port address and the Interrupt Request address of Serial Port 1 and Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. Select 3F8/IRQ4 to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are Disabled, **3F8/IRQ4**, 3E8/IRQ4, 2E8/IRQ3, and 2F8/IRQ3. The options for Serial Port2 are Disabled, **2F8/IRQ3**, 3E8/IRQ4, 3F8/IRQ4, and 2E8/IRQ3.

Serial Port 2 Attribute

This feature allows the user to set COM 2 as a normal serial port or a virtual COM port used for SOL (Serial Over LAN). The options are **SOL** and COM.

▶Remote Access Configuration

Remote Access

Select Enabled to enable Remote Access support. The options are Disabled and **Enabled**. If Remote Access is set to Enabled, the following items will display:

Serial Port Number

This feature allows the user decide which serial port to be used for Console Redirection. The options are COM 1 and **COM 2**.

Base Address, IRQ

This item displays the based address and IRQ of the serial port specified above.

Serial Port Mode

This feature allows the user to set the serial port mode for Console Redirection. The options are **115200 8, n 1**; 57600 8, n, 1; 38400 8, n, 1; 19200 8, n, 1; and 9600 8, n, 1.

Flow Control

This feature allows the user to set the flow control for Console Redirection. The options are **None**, Hardware, and Software.

Redirection After BIOS POST

Select Disabled to turn off Console Redirection after Power-On Self-Test (POST). Select Always to keep Console Redirection active all the time after POST. (Note: This setting may not be supported by some operating systems.) Select Boot Loader

to keep Console Redirection active during POST and Boot Loader. The options are Disabled, Boot Loader, and **Always**.

Terminal Type

This feature allows the user to select the target terminal type for Console Redirection. The options are ANSI, **VT100**, and VT-UTF8.

VT-UTF8 Combo Key Support

A terminal keyboard definition that provides a way to send commands from a remote console. Available options are **Enabled** and Disabled.

Sredir Memory Display Delay

This feature defines the length of time in seconds to display memory information. The options are **No Delay,** Delay 1 Sec, Delay 2 Sec, and Delay 4 Sec.

▶Hardware Health Monitor

This feature allows the user to monitor system health and review the status of each item as displayed.

CPU Overheat Alarm

This option allows the user to select the CPU Overheat Alarm setting which determines when the CPU OH alarm will be activated to provide warning of possible CPU overheat.

Warning! 1.Any temperature that exceeds the CPU threshold temperature predefined by the CPU manufacturer may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans will run at full speed. 2. To avoid possible system overheating, please be sure to provide adequate airflow to your system.

The options are:

- The Early Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered as soon as the CPU temperature reaches the CPU overheat threshold as predefined by the CPU manufacturer.

- **The Default Alarm**: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered when the CPU temperature reaches about 5ºC above the threshold temperature as predefined by the CPU manufacturer to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, please take immediate action as shown below.

CPU 1 Temperature/CPU 2 Temperature/System Temperature

This feature displays current temperature readings for the CPU and the System.

The following items will be displayed for your reference only:

CPU1 Temperature/CPU2 Temperature

The CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) has been upgraded to a more advanced feature by Intel in its newer processors. The basic concept is each CPU is embedded by unique temperature information that the motherboard can read. This 'Temperature Threshold' or 'Temperature Tolerance' has been assigned at the factory and is the baseline on which the motherboard takes action during different CPU temperature conditions (i.e., by increasing CPU Fan speed, triggering the Overheat Alarm, etc). Since CPUs can have different 'Temperature Tolerances', the installed CPU can now send information to the motherboard what its 'Temperature Tolerance' is, and not the other way around. This results in better CPU thermal management.

Supermicro has leveraged this feature by assigning a temperature status to certain thermal conditions in the processor (Low, Medium and High). This makes it easier for the user to understand the CPU's temperature status, rather than by just simply seeing a temperature reading (i.e., 25^{o}C). The CPU Temperature feature will display the CPU temperature status as detected by the BIOS:

Low – This level is considered as the 'normal' operating state. The CPU temperature is well below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS (Fan Speed Control).

User intervention: No action required.

Medium – The processor is running warmer. This is a 'precautionary' level and generally means that there may be factors contributing to this condition, but the CPU is still within its normal operating state and below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings.

User intervention: No action is required. However, consider checking the CPU fans and the chassis ventilation for blockage.

High – The processor is running hot. This is a 'caution' level since the CPU's 'Temperature Tolerance' has been reached (or has been exceeded) and may activate an overheat alarm.

User intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation and room temperature to correct any problems.

Notes: 1. The system may shut down if it continues for a long period to prevent damage to the CPU.

2. The information provided above is for your reference only. For more information on thermal management, please refer to Intel's Web site at www.Intel.com.

System Temperature: The system temperature will be displayed (in degrees in Celsius and Fahrenheit) as it is detected by the BIOS.

Fan 1 ~ Fan 8 Reading

This feature displays the fan speed readings from fan interfaces Fan 1 through Fan 8.

Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase for effective system cooling. Select "Full Speed/FS" to allow the onboard fans to run at full speed for maximum cooling. The FS setting is recommended for special system configuration or debugging. Select "Performance/PF" for better system cooling. The PF setting is recommended for high-power-consuming and high-density systems. Select "Balanced/BL" for the onboard fans to run at a speed that will balance the needs between system cooling and power saving. The BL setting is recommended for regular systems with normal hardware configurations. Select "Energy Saving/ES" for best power efficiency and maximum quietness. The Options are: Full Speed/FS, Performance/PF, **Balanced/BL**, and Energy Saving/ES.

Voltage Monitoring

CPU1 Vcore, CPU2 Vcore, CPU1 DIMM, CPU2 DIMM, 1.1V, 3.3V, 1.5V, 5V, 12V, 3.3VSB, 5VSB, and Vbat.

▶ACPI Configuration

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

ACPI Aware O/S

Select Yes to enable ACPI support for an operating system that supports ACPI. Select No to disable ACPI support for an OS that does not support ACPI. The options are **Yes** and No.

ACPI Version Features (Available ACPI Aware O/S='Yes')

The options are ACPI v1.0, **ACPI v2.0** and ACPI v3.0. Please refer to ACPI's website for further explanation: http://www.acpi.info/

ACPI APIC Support (Available ACPI Aware O/S='Yes')

Select Enabled to include the ACPI APIC Table Pointer in the RSDT (Root System Description Table) pointer list. The options are **Enabled** and Disabled.

APIC ACPI SCI IRQ

When this item is set to Enabled, APIC ACPI SCI IRQ is supported by the system. The options are **Enabled** and Disabled.

Headless Mode (Available ACPI Aware O/S='Yes')

This feature is used to enable system to function without a keyboard, monitor or mouse attached The options are Enabled and **Disabled**.

High Precision Event Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

NUMA Support

Select Enabled to use the feature of Non-Uniform Memory Access to improve CPU performance. The options are Disabled, **Enabled** and NUMA for SLES 11 (SUSE Linux Enterprise Server 11).

WHEA Support

Select Enabled to enable Windows Hardware Error Architecture (WHEA) support which will provide a common infrastructure for the system to handle hardware errors on Windows platforms in order to reduce system crashes due to hardware errors and to enhance system recovery and health monitoring. The default setting is **Enabled**.

▶Intel TXT(LT) Configuration

Intel TXT Initialization

Select Enabled to initialize Intel Trusted Execution Technology (TXT) to provide the building blocks and create trusted-platforms for safe computing. The options are **Disabled** and Enabled. If this item is set to Enabled, the following items will display.

BIOS AC[SCLEAN] (Available when Intel TXT(LT) Initialization is enabled)

Select Enabled to allow the processor to load an authenticated code (AC) module in an internal memory partition to ensure that the CPU, chipset and all other related components are launched in the same protected environment for trusted-platform computing. The options are Disabled and **Enabled**.

BIOS AC[SCHECK] (Available when Intel TXT(LT) Initialization is enabled)

Select Enabled to allow the authenticated code (AC) module to check that hardware, the memory protection mechanism and the domain manager are configured properly to ensure safe computing in the Trusted Computing Platform Module. The options are Disabled and **Enabled**.

Load DPR (Available when Intel TXT(LT) Initialization is enabled)

Select Enabled to load a DPR which is a powerful, lightweight, and compact module used to track and record vital data in running electric-powered radio-controlled components for trusted-platform computing. The options are Disabled and **Enabled**.

Reset TPM Establishment Flag (Available when Intel TXT(LT) Initialization is enabled)

Select Enabled to reset Trusted Platform Module Establishment Flag for safe computing. The options are Disabled and **Enabled**.

▶Trusted Computing (Optional)

TCG/TPM Support

Select Yes on this item and enable the TPM jumper on the motherboard to enable TCG (TPM 1.1/1.2)/TPM support to improve data integrity and network security. The options are **No** and Yes. If this feature is set to Yes, the following items will display.

Indicate Physical (Available when TCG/TPM Support = 'Yes')

Select Yes for the BIOS to detect the presence of TPM devices at system boot. Select No to hide the presence of TPM devices at system boot. The options are Yes and **No**.

TPM Deactivated (Available when TCG/TPM Support = 'Yes')

Select Set to disable TPM support at bootup. Select Clear to activate the TPM devices to at bootup. Select Don't Change to keep the current TPM support status. The options are Set, Clear, and **Don't Change**.

TPM Owner (Available when TCG/TPM Support = 'Yes')

This feature allows the user to configure TPM Owner settings. The options are **Don't Change**, Enable Install, Disable Install, and Clear.

Execute TPM Command (Available when TCG/TPM Support = 'Yes')

Select Enabled to execute TPM commands you've selected. Select Don't Change to keep the current TPM commands without making any changes. Select Disabled to abandon the changes you have made on TPM commands. The options are Enabled, Disabled and **Don't Change**.

TPM Enable/Disable Status

This item displays the status of TPM Support to indicate if TPM is currently enabled or disabled.

TPM Owner Status

This item displays the status of TPM Ownership.

▶IPMI Configuration

Intelligent Platform Management Interface (IPMI) is a set of common interfaces that IT administrators can use to monitor system health and to manage the system as a whole. For more information on the IPMI specifications, please visit Intel's website at www.intel.com.

IPMI Firmware Version

This item displays the current IPMI Firmware Version.

Status of BMC

The Baseboard Management Controller (BMC) manages the interface between system management software and platform hardware. This item displays the status of the current BMC controller.

▶View BMC System Event Log

This feature displays the BMC System Event Log (SEL). It shows the total number of entries of BMC System Events. To view an event, select an Entry Number and pressing <Enter> to display the information as shown in the screen.

- Total Number of Entries
- SEL Entry Number
- SEL Record ID

- SEL Record Type
- Event Timestamp
- Generator ID
- Event Message Format Ver.
- Event Sensor Type
- Event Sensor Number,
- Event Dir Type
- Event Data.

Clear BMC System Event Log

Clear BMC System Log now

Select OK and press the <Enter> key to clear the BMC system log immediately. Select Cancel to keep the BMC System log. The options are **OK** and Cancel.

Caution: Any cleared information is unrecoverable. Make absolutely sure that you no longer need any data stored in the log before clearing the BMC Event Log.

▶Set LAN Configuration

Set this feature to configure the IPMI LAN adapter with a network address as shown in the following graphics.

Channel Number - This feature displays the channel number.

Channel Number Status - This feature returns the channel status for the Channel Number selected above: "Channel Number is OK" or "Wrong Channel Number".

IP Address Source

This features allows the user to select how an IP address is assigned to a client computer or network device. Select DHCP (Dynamic Host Configuration Protocol) to allow a client (computer or device) obtains an IP address from a DHCP server that manages a pool of IP addresses and network information on a "request and grant" basis. Upon time-out (or lease expiration), the IP address

assigned to the client can be reassigned to a new client. Select Static (Static Allocation) to allow the host server to allocate an IP address based on a table containing MAC Address/IP Address pairs that are manually entered (probably by a network administrator). Only clients with a MAC address listed in the MAC/IP Address Table will be assigned an IP address. The IP Address allocated to the client is on a longer term basis than that assigned by the DHCP mentioned in the other option. The options are **DHCP** and Static.

IP Address

The BIOS will automatically enter the IP address for the system when the IP Address Source is set to 'Static'. It can also allow the user to set an IP address for the system If the IP Address Source is set to "DHCP". However, the IP address may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

Subnet Mask (When IP Address Source is set to 'Static')

This item displays the current subnet mask setting for your IPMI connection. The value of each three-digit number separated by dots should not exceed 255.

Gateway Address (When IP Address Source is set to 'Static')

The BIOS will automatically enter the Gateway address for the system when the IP Address Source is set to 'Static'. It can also allow the user to set a Gateway address for the system If the IP Address Source is set to "DHCP". However, the Gateway address may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

MAC Address (When IP Address Source is set to 'Static')

The BIOS will automatically enter the MAC address for the system when the IP Address Source is set to 'Static'. It can also allow the user to set an MAC address for the system If the IP Address Source is set to "DHCP". However, the MAC address may be overwritten. Mac addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots. (i.e., 00.30.48.D0.D4.60).

BMC Watch Dog Timer Action

Allows the BMC to reset or power down the system if the operating system hangs or crashes. The options are **Disabled**, Reset System, Power Down, Power Cycle. If the feature is not set to Disabled, the following item will display.

BMC Watch Dog TimeOut [Min:Sec]

This option appears if BMC Watch Dog Timer Action (above) is enabled. This is a timed delay in minutes or seconds, before a system power down or reset

after an operating system failure is detected. The options are **[5 Min]**, [1 Min], [30 Sec], and [10 Sec].

▶DMI Event Log Configuration

View Event Log

Use this option to view the System Event Log.

Mark All Events as Read

This option marks all events as read. The options are **OK** and Cancel.

Clear Event Log

This option clears the Event Log memory of all messages. The options are **OK** and **Cancel.**

PCIE Event Log

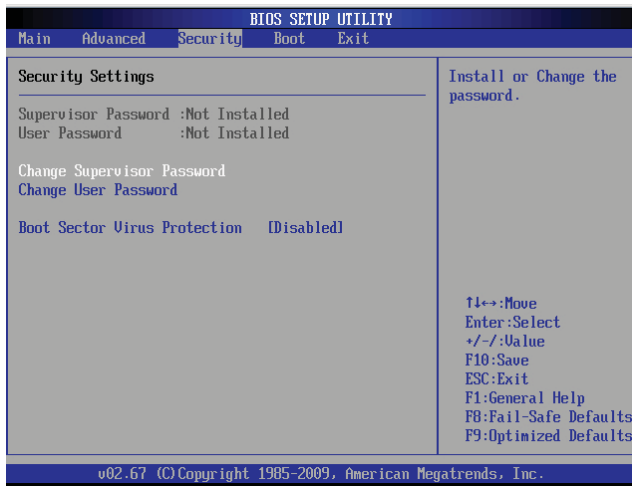
Select Yes to activate and display the PCI-Express slot event log. The options are Yes and **No**.

Memory ECC Error Log

Select Yes to activate and display ECC Memory Error event log. The options are **Yes** and No.

7-4 Security Settings

The AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.



Supervisor Password

This item indicates if a Supervisor password has been entered for the system. "Not Installed" means a Supervisor password has not been used.

User Password

This item indicates if a user password has been entered for the system. "Not Installed" means that a user password has not been used.

Change Supervisor Password

Select this feature and press <Enter> to access the submenu, and then type in a new Supervisor Password.

User Access Level (Available when Supervisor Password is set as above)

Available options are **Full Access**: grants full User read and write access to the Setup Utility, View Only: allows access to the Setup Utility but the fields cannot be changed, Limited: allows only limited fields to be changed such as Date and Time, No Access: prevents User access to the Setup Utility.

Change User Password

Select this feature and press <Enter> to access the submenu , and then type in a new User Password.

Clear User Password (Available only when User Password has been set)

This item allows you to clear a user password after it has been entered.

Password Check

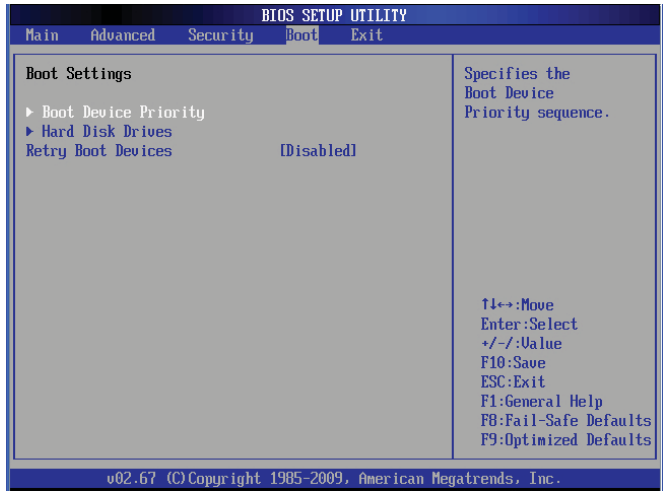
Select Setup for the system to check for a password at Setup. Select Always for the system to check for a password at bootup. The options are **Setup** and Always.

Boot Sector Virus Protection

When Enabled, the AMI BIOS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

7-5 Boot Configuration

Use this feature to configure boot settings.



▶Boot Device Priority

This feature allows the user to specify the sequence of priority for the Boot Device. The settings are 1st boot device, 2nd boot device, 3rd boot device, 4th boot device, 5th boot device and Disabled.

- 1st Boot Device - [SATA: XXXXXXXXX]

▶Hard Disk Drive, CD/DVD-ROM Drive, Removable Drive

This feature allows the user to specify the boot sequence from all available hard disk drives. The settings are Disabled and a list of all hard disk drives that have been detected (i.e., 1st Drive, 2nd Drive, 3rd Drive, etc).

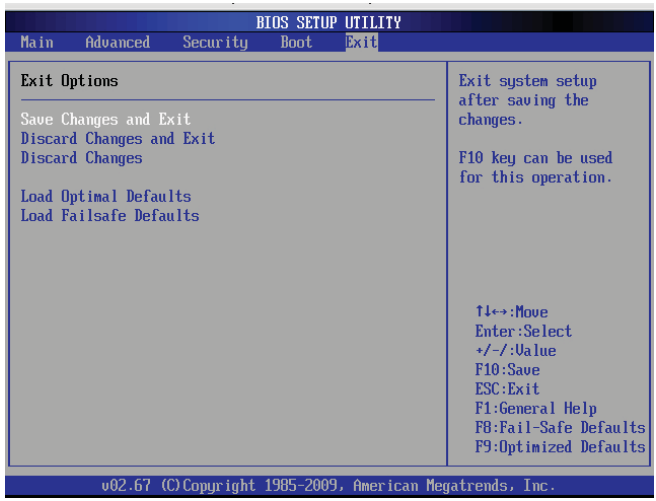
- 1st Drive - [SATA: XXXXXXXXX]

Retry Boot Devices

Select Enabled to enable Retry Boot Devices support to allow the system to attempt to boot from a specific boot device after a boot failure. The options are Enabled and **Disabled**.

7-6 Exit Options

Select the Exit tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave the BIOS Setup Utility and reboot the computer, so the new system configuration parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

Discard Changes

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

Load Optimal Defaults

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then, select OK to allow the AMI BIOS to automatically load Optimal Defaults to the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

Load Fail-Safe Defaults

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not for maximum performance.

Notes

Appendix A

BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list correspond to the number of beeps for the corresponding error.

BIOS Error Beep Codes

Beep Code	Error Message	Description
1 beep	Refresh	Circuits have been reset. (Ready to power up)
5 short beeps + 1 long beep	Memory error	No memory detected in the system
8 beeps	Display memory read/write error	Video adapter missing or with faulty memory
Continuous High (pitch) + Low (pitch) (siren-like)	System OH	System Overheat

Notes

Appendix B

System Specifications

Processors

Single or dual Intel® 5500/5600 Series processors in LGA1366 sockets

Note: Please refer to our web site for a complete listing of supported processors.

Chipset

Intel 5520/ICH10R chipset

BIOS

32 Mb AMI® SPI Flash ROM

Memory Capacity

Eighteen DIMM sockets supporting up to 192 GB of registered ECC DDR3-1333/1066/800 or 48 GB of unbuffered ECC/non-ECC DDR3-1333/1066/800 SDRAM

See the memory section in Chapter 5 for details.

SAS Controller

LSI 2108 SAS controller for eight-port SAS, which supports RAID 0, 1, 5, 6, 10, 50 and 60 (RAID 5 supported with Windows OS only)

SATA Controller

Intel ICH10R on-chip controller for six-port SATA, which supports RAID 0, 1, 5 and 10 (RAID 5 supported with Windows OS only)

Drive Bays

Four hot-swap drive bays to house SAS or SATA drives

Peripheral Drive Bays

One slim DVD-ROM drive

Expansion Slots

Left side: two PCI-E x8 add-on cards (w/ RSC-R1UU-2E8 riser)
Right side: one PCI-E x8 card (w/ RSC-R1UU-E8R+ riser)

Serverboard

6016T-6RFT+: X8DTU-6TF+ (Proprietary form factor)
6016T-6RF+: X8DTU-6F+ (Proprietary form factor)
Dimensions: 16.5 x 12.8 in (419 x 325 mm)

Chassis

SC819TQ-R700U (1U rackmount)
Dimensions: (WxHxD) 19 x 1.7 x 27.75 in. (483 x 43 x 705 mm)

Weight

Gross Weight: 38.5 lbs. (17.5 kg.)

System Cooling

Five 4-cm counter-rotating fans (FAN-0086L4)

System Input Requirements

AC Input Voltage: 100-240 VAC
Rated Input Current: 10-4A
Rated Input Frequency: 50 to 60 Hz

Power Supply

Rated Output Power: 700W (Part# PWS-703P-1R)
Rated Output Voltages: +12V (58A), +5Vsb (3A)

Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 20% to 95% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. “Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate”

Notes

(continued from front)

The products sold by Supermicro are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, Supermicro disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold Supermicro harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.